Clinical Medicine and Surgery

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CLINICAL MEDICINE AND SURGERY

VOLUME 37 JANUARY, 1930 NUMBER 1

Galen

IN ordinary conversation and writing, few ever stop to think what the words they use so easily orginally meant. If we did consider this thing a little, it might enlarge our outlook. For example, the word, artery, contains a key to ancient scientific beliefs (if we can use that word to describe what were largely superstitions, accepted on the word of recognized authorities). The Greek roots of the word are ἀήρ (aer), meaning air, and Τήρειν (terein), to keep; because, prior to the time of Galen, these vessels were supposed to contain air. Galen demonstrated the truth by ligating an artery in two places and then making an incision in the isolated segment, releasing blood.

Clarissimus (often erroneously called Claudius) Galen, who is generally recognized as having been, saving only Hippocrates, the greatest physician of the ancient times, was also a Greek, like his famous predecessor and hero, having been born at Pergamus, Greece, about 130 A.D. (approximately 500 years after the death of the Father of Medicine).

His father was a cultured and wealthy architect and philosopher, named Nicon, who was eager that his son should receive a liberal education and become a scholarly person. So Clarissimus was placed under the tutelage of a number of the foremost scientists and philosphers of the time until, when he was about seventeen years old, he twice dreamed that Apollo, the god of healing, appeared to him and urged him to study Medicine.

He then started out in pursuit of a knowledge of the healing art, which he followed diligently, wandering from place to place, studying under any who seemed to have some worthy instruction to offer him and spending considerable time in the famous school of Medicine at Alexandria, Egypt.

After ten years of this peripatetic life, he returned to his native city, where he was appointed physician to the gladiators, which duties he performed for four years.

About 164 A.D. he established himself as a practitioner in Rome, and soon attained unquestioned leadership in his profession—and the envious jealousy of the Roman physicians. He was made court physician and was the general advisor of the emperior, Marcus Aurelius, whose "Meditations" are known to every schoolboy nearly 2,000 years later, and, for a few years, of his disastrous son, Commodus.

But Galen had been a wanderer too

long to settle down to the routine life of a clinician, however successful and highly placed, so he retired from his honorable position, after a comparatively short time, and devoted the rest of his life (which ended in 201 A.D.) to travel, study and teaching.

Galen was a versatile man of many talents, as compared to the true genius, represented by Hippocrates. He was the most skilled and successful clinician of his time and, in fact, of all antiquity, but he left few satisfactory records of his methods of treatment. Moreover, his wide experience and regular success bred in him a dogmatic attitude of pragmatism which, indeed, made him the authority, to doubt whom was heresy, for nearly 1,400 years; but, because a number of his ideas were erroneous, this very condition hindered medical progress for centuries.

As an anatomist, Galen's conclusions were frequently unsound, because most of his research was conducted upon the bodies of dogs, hogs, monkeys and other lower animals. However, he knew his osteology well (he was the first to classify the vertebrae as cervical, dorsal and lumbar), understood the difference between the origin and insertion of muscles, recognized many of the structures of the brain and described seven of the twelve cranial nerves. His anatomic pronouncements were accepted as gospel, up to the time of Vesalius.

He was the first man to devise methods of putting questions to nature, and then arranging things so that nature could answer them. This procedure we now call *experiment*, and Galen deserves the the title of Father of Experimental Physiology, his work in connection with the nervous system having been especially sound and enlightening.

Galen was also a great writer, having begun his literary career at twenty, and was the author of nearly 500 books on anatomy, physiology, pathology, pharmacy and clinical practice, which form a monumental encyclopedia of the science and medical knowledge of that day. His name comes down to us in connection with the preparations of vegetable drugs, which he used freely and in "shotgun" combinations, and which are often spoken of, today, as galenicals. His prescriptions show an intelligent use of opium, hellebore, colocynth, turpentine, alcohol, and other remedies, including such supposedly modern therapeutic measures as grape-juice, barley-water and cold compresses. He understood the infectious nature of tuberculosis and recommended a milk diet and climatotherapy for its treatment.

This great Greco-Roman added immeasurably to the development of Medicine along scientific lines, but three principal fallacies started his successors off along the wrong path so that, because of the enormous weight of his prestige, advancement was up a blind alley.

The first of these errors was that he had strong teleologic preconceptions and tended to make his findings fit his theories, instead of recording actual facts, as Hippocrates did; the second was the idea that the blood passed from the right to the left ventricle through hypothetical, invisible pores, which dogma held back the true conception of the circulation until the time of Harvey; and the third was the doctrine of "laudable pus" which, though combated by Paracelsus (who was anathema to his confreres, partly because he questioned the dicta of the medical pope) and Paré, held sway until the time of Lister.

But, in spite of his mistakes, Galen was one of the great masters of Medicine, and his experiments on the physiology of the nervous, respiratory and circulatory systems constituted the only real scientific knowledge along these lines for nearly seventeen hundred years.

One of the chief tokens of ability is to have plenty of time for everything. The more one does, the more one is able to do.—Anna R. Burr.

Progress in the Science and Art of Medicine—1929

THE periodic review is a recognized factor in teaching along all lines, and there can be little doubt of the real value of a glance over the field of recent progress, at the beginning of the year, in order that we may orient ourselves and be prepared to observe the outcome of new ideas which have recently been propounded.

This survey makes no pretense of being complete or exhaustive. Others may have different ideas of what the high spots of the past year's work really are; and it is impossible, in a limited space and time, to summarize the literature on the various points touched. Everything here mentioned has, however, been more or less fully discussed, during the last twelve months, in this or other readily available medical periodicals, so that any who find that a mere reference to the various subjects does not refresh the memory, can, with small effort, gain such information as may be lacking.

General Research

It would seem that the discovery, by Bonhoeffer, of Berlin, that hydrogen can be split into two parts; and the further finding that there are isotropes of oxygen and carbon may, perhaps, offer larger possibilities of revolutionary developments than anything else brought out during the past year. These discoveries are claimed by both Chemistry and Physics, as they were made in the debatable territory between these two sciences, indicating that they may not be so distinctly separate as was formerly supposed.

Within approximately the past year, insulin, tuberculin, urease and pepsin have been produced in crystalline form. This high degree of purification of hitherto little-understood protein substances will give an immense impetus to their chemical investigation, which should shed much light upon certain cloudy problems in physiology.

The question, as to why the flexor and extensor muscles, supplied by the same nerve, do not contract simultaneously, appears to have been solved by the hypothesis of Lapicque, of France, who declares that certain nerve fibers are "tuned" (like a radio receiver) to certain impulses, but not to others. The time element in nervous phenomena has been called **chronaxia,** and may help us in the study of these mechanisms.

Of more direct clinical import are: (1) The discovery that the *inorganic* constituents of liver (manganese, nickel, copper, germanium and arsenic, combined with iron) appear to have a definite effect in the cure of **the anemias,** and that *pure* iron has little or no power in this direction; (2) that the whole stomach (of hogs and, perhaps, of other animals), given fresh or dried and powdered, gives practically the same results in pernicious anemia as those obtained with liver and kidneys; and (3) the reported standardization of the hormone of the testes.

The first publications of the Committee on the Cost of Medical Care have appeared during the year. They are merely a handy correlation of existing statistics on the prevalence of disease and disability and the agencies available for the care of the sick and disabled, with a few notes on hospital facilities for persons of moderate means. These studies are continuing.

The study of psychology and the appreciation of the psychic factors in disease are steadily gaining ground in the profession. This work is hampered by the fact that orthodox scientists are by no means agreed as to the nature of the

emotional reactions and of the mind, and are unwilling to accept, even as an hypothesis, the illuminating explanations offered by the students of occultism.

An organism, **S. Morbilli,** has been announced as the specific cause of **measles,** with a statement that an antitoxin, generated by this coccus, has been effective in the prophylaxis of the disease.

Medical Teaching

The developments in **photography** and the use of mechanically recorded sound have been astonishing, and bid fair to revolutionize the teaching of Medicine.

Clinical moving pictures—a curiosity only a few years ago—are coming into almost routine use for the demonstration of cases and of procedures; and the development of apparatus for the taking of such pictures goes on apace. Pictures of peristalsis of the intestines, and even of the valves of the heart in action, have been shown recently, as well as several moving photomicrograms, such as the famous Canti film. Serial bronchograms, resembling moving pictures, have been produced, with a special camera, by Stevens, of Detroit, and his collaborators.

Moving pictures have been combined with speech, so that the ear, as well as the eye, receives impressions. Thus the famous teacher can be carried to those who cannot come to him.

The Gastro-Photor now enables us to photograph the interior of the stomach directly; new cameras are being developed, intended particularly for clinical work; a simplified process for direct color photography, which will give us lantern slides having the true appearance of nature, has been offered to the profession.

Diagnosis

With the perfecting of practical, portable electrocardiographs and metabolimeters, these procedures are becoming more popular and more widely used.

A **universal indicator**—not especially new, but not yet widely known and used, in this country—will show the approximate pH of urine or any other solution, by a variation in color, from red (for pH 3.0), through orange, yellow, green and blue, to deep, reddish-violet (for pH 11.0).

A new and allegedly less dangerous substitute for tuberculin in skin testing has been introduced, and is known as **Dermatubin**. It appears to be still in the experimental stage.

Therapeutics

The outstanding development of this year, in therapeutics, has been the commercial introduction of **viosterol** and the demonstration that it appears actually to *be* vitamin D and is specific in the prophylaxis and treatment of rickets and tetany, as well as being useful in a number of other conditions.

Another new drug which seems to show considerable possibilities is **calcium gluconate.** Heretofore, the only salt of this element, available for parenteral use, has been the chloride, which is so irritating that it can be given only intravenously. The gluconate can be advantageously administered by mouth, intravenously or intramuscularly.

The two pituitary hormones, whose discovery was mentioned last year in our "Progress" editorial, are now available commercially, under the names of **Pitressin** (pressor and antidiuretic hormone) and **Pitocin** (oxytocic substance, for obstetric use). These are known, officially, as *beta* and *alpha hypophamine*,, respectively.

Three interesting and promising new ideas have been advanced in connection with **anesthesia**: The intravenous use of sodium amytal and also of pure ethyl alcohol combined with dextrose solution, for the production of general anesthesia; and the rectal administration of **Avertin** (tribromethyl alcohol), for the same purpose. These are still more or less experi-

mental, but the reports on them which have been appearing of late are encouraging.

Observing certain similarities in the symptoms of pernicious anemia and **sprue,** several investigators have attempted to treat the latter disease by means of a liver diet, with rather cheering results.

The treatment of *athrepsia* and *malnutrition,* by giving **dextrose,** by mouth or intravenously, and burning it with **insulin,** is receiving wider recognition. And the *oral* administration of *typhoid vaccines* (*à la Besredka*) appears to be gaining ground.

Infections with **Vincent's organism** are being successfully attacked by the intramuscular injection of preparations of **bismuth.**

Work continues to be done on the employment of convalescent serums in the treatment of **poliomyelitis;** and, while this procedure cannot be said to be definitely formulated or widely accepted, neither has it been rejected. It is found that these serums are effective, even if taken from a person who has had the disease many years before.

A modification of the powerful antiseptic and germicide, **Metaphen,** has been produced, which is soluble in *vegetable oils.* Such a solution is being used, locally, with excellent results, in a number of cases of acute and chronic **gonorrhea.**

The use of **chlorophyll** in the treatment of blood dyscrasias and other conditions is attracting some attention, and research along this line is being prosecuted.

A refined and concentrated **antipneumonococcic serum,** which is said to produce few reactions (none of them severe), to give good results in cases of pneumonia due to organisms of Types I and II, and to be relatively easy to administer, is now available commercially.

A preparation of **ovarian hormone** has been perfected, in the form of vaginal suppositories, which is reported to give satisfactory results in cases where intramuscular injections are impracticable.

Physical Therapy

Nothing especially astonishing has developed in physical therapy during the past year, except the production of a quartz-mercury bulb—and, possibly another, of the filament type—which produces radiations closely approximating those of the sun and is safe and simple to use, as a hygienic measure, in the home.

Several new machines have appeared at the exhibitions, which seem to have definite value, but it is too soon to attempt to evaluate their potentialities. The market is flooded with carbon arc lamps and mechanical massage-vibrators, some of which appear to be made, like Hodge's razors, "to sell."

Electrosurgery is assuming a more important position in various types of operative work, especially that on the brain.

The scientific aspect of physical therapy appears to be practically marking time, for the present.

Medical Art and Economics

Only a few years ago, the recognized authorities looked rather superciliously upon any therapeutic measure whose efficacy could not be demonstrated in the laboratory. That day is, fortunately, passing. The earnest and intelligent clinician, who obtains defiite results in the amelioration and cure of disease, even by measures which cannot be proved in the test-tube or the guinea pig, is no longer something of a professional outcaste. The Art of Medicine, is, once more, assuming more nearly its due value!

Much stress has been laid upon the economics of medicine and the importance of professional organization. This is well, for rarely, if ever, did Medicine so stand at the parting of the ways. The world

is changing very rapidly, of late, and unless we are prepared to adapt ourselves to these changing conditions, we will be turned under by the plowshare of progress.

There may be some danger that certain ones among us may become so obsessed by the business side of practice, that they will lose sight of their prime function as servers of humanity. The two lines of thought are not, however, mutually exclusive. It is entirely possible for the kindly, sympathetic and able healer to be, at the same time, a good business man.

Our chief problems, in this year of grace, seem to be to perfect and strengthen our organizations, so that we shall be able to control and direct the various factors in the restoration and maintenance of health; and to discover some method or methods, whereby everyone in our Land may be assured of such medical service as his needs demand, at a price he is reasonably able to pay.

We shall do well if, during the coming year, we dedicate earnest thought and sincere effort to the solution of these problems.

The power to act with decision, within the limits of the medically attainable, with the attendant knowledge that uncertainty is with us ever, is valuable in medicine.—Dr. S. Weir Mitchell.

Prizes and Propositions

IT HAS been a traditional policy of CLINICAL MEDICINE AND SURGERY, ever since its beginning thirty-six years ago, that it is a *readers'* journal, and that the cooperation of those who turn our pages in search of help and inspiration is eagerly sought.

In order further to stimulate the interest, which is already keen, and to encourage a number of men with ideas, but who rarely write, to contribute to our pages, we have decided to offer some definite incentives, in the form of prizes, and to stress certain lines of discussion which our contact with medical men, all over the world, leads us to believe will prove especially interesting and fruitful.

Many of the younger men have done research during their undergraduate years, and are now accomplishing worthy things in practice. We want them to look upon us as a friend and helper, so the first prize we offer is open only to physicians who have been in practice for *two years or less.* For the best article by such a one, received on or before June 30, 1930, we will pay the author twenty-five dollars; for the second-best, fifteen dollars; and for the third in order of merit, ten dollars. The editorial board of CLINICAL MEDICINE AND SURGERY will be the judges.

These articles should deal with *clinical* research in medicine or surgery or with therapeutics of any type whatever, and must be practical and helpful. All procedures must be given in detail, and for any remedies discussed, the size and frequency of doses, method of administration or technic of application must be stated, accurately and fully. The most satisfactory length for such articles is from 2,000 to 4,000 words. Illustrations may be used, if required or desirable.

If no manuscripts of prize-worthy quality are received, no prizes will be awarded. All prize-winning articles will be published in CLINICAL MEDICINE AND SURGERY, and also any others received which are deemed worthy of publication. The soundness of the material presented will be given chief weight, but the neatness of the manuscript (clear typing, double spacing and wide margins) and correctness of the English composition will be considered.

The conditions for the other four prize offers, which are open to all our readers, are the same; that is, first prize, $25; second, $15; third, $10. If less than three publishable articles are received on any subject, no prizes will be awarded. All articles accepted for any of these competitions will

be published in one issue of this journal, and a coupon will be included on which *our readers* may vote as to which they consider the most practical and valuable. The prizes will be given on the basis of these ballots. Manuscripts must be typed, with double spacing and wide margins. Full details of research experiments and of treatment given must be stated, the same as in the competition for young doctors.

The first subject is "colds." Manuscripts for this competition must be in our hands before midnight of February 10, 1930 (the sooner the better), and will be published in the March issue.

The second subject is arthritis or "rheumatism," and manuscripts must reach us on or before April 1, 1930. They will be published in May. Good, clear photographs of patients, showing results of treatment, will probably strengthen these articles.

The third subject is "The Future of Medicine," and we must have these manuscripts by June 1, for publication in July. This field is broad, and may cover education, research, therapeutics, economics or any other line of medical activity.

The fourth subject is parenteral (hypodermic, intramuscular and intravenous) medication, and we want the papers in our hands before October 1, for publication in November. Here is a line of work in which every physician should have practical experience and helpful ideas.

We hope that enough manuscripts will be received on each of these subjects, so that we can do some careful selecting. The number we can publish will depend largely upon their length. Other things being equal, we are of the opinion that articles of from 1,500 to 3,000 words will make the best impression. Authors whose contributions are not accepted for publication must not feel discouraged, but must try even harder next time.

Realizing that the organization and equipment of a physician's office plays an important part in his success, we want to see stories and pictures by the men who have done this job in a workmanlike and efficient manner. We will publish any such stories we receive, long or short, if they are sound and workable, and will pay one dollar for every picture used to illustrate them.

The physician of today cannot carry on successfully without the cooperation of the dentist and the pharmacist. We need these fellows, and they need us. Our pages are open to the men in these professions who have something *real* to tell us about the ways in which their work and ours will fit together to attain the best results.

Clinical Examination Week

We have talked a great deal about clinical examinations, at periodic intervals, for the supposedly well. Now we purpose to make a vigorous drive in this direction, by sponsoring and endeavoring to inaugurate a "*Clinical Examination Week*" in as many communities as possible.

Before launching our campaign, we desire as much good counsel as we can secure, and to that end we are eager to hear from any or all of our readers who have ideas bearing upon such a plan. How best can the scheme be "put across" to the public? How can the cooperation of Chambers of Commerce, women's clubs, luncheon clubs (Rotary, Kiwanis, etc.) and other civic organizations, as well as of dentists and pharmacists, be enlisted? How should the examinations be conducted? And a dozen other matters of policy and practice. Come across with your experience and your thoughts!

This, then, is a program about which we feel decidedly keen, and we hope that our enthusiasm will prove to be contagious and will meet with a response, even beyond our dreams.

There is a short rule for obtaining the confidence of your community—*deserve it!*—Dr. Oliver Wendell Holmes.

Old Desires

NEARLY eight hundred years ago, there lived and loved, in Persia, a poet and philosopher named Omar. He was highly regarded as an astronomer and mathematician, in his day, but that side of his activities has been largely lost in the mists of the years and the rush of modern progress. He lives for us, today, as vitally as he lived for his contemporaries of the eleventh and twelfth centuries, because of an avocation and emotional outlet which he cultivated by the writing of something like 5,000 quatrains (called in the Persian tongue, *rubáiyát*), in which he set forth his amatory and bibulous adventures and much of his philosophy, just as the impulse struck him. When he wrote thus he adopted, like many moderns, a *takhallus* or *nom de plume*, derived from his early labors as a tentmaker, calling himself, Omar Khayyám.

One of these *rubáiyát*, as translated, in 1859, by Edward Fitzgerald, begins with the lines:

"Now the New Year, reviving old desires,
The thoughtful soul to solitude retires."

and therein gives us, not merely a statement of what was, presumably, his own practice, but a maxim worthy of being acted upon by all thoughtful men of all ages, and particularly applicable to this hurrying and preoccupied generation.

Much has been said and written about the advantages—nay, the *necessity*—for taking a periodic inventory of one's intellectual and spiritual accomplishments and acquisitions, from time to time, and likewise regarding the high values of an avocation, as means for the release of physical, emotional and mental energies not exercised in the winning of one's daily bread. But too little stress has been laid upon the equally pressing necessity for occasional periods of pondering, in solitude, upon the years that lie before us and the development of plans, whereby we may arrive at the satisfaction of our "old desires," which rise up, at times, to mock us with the fact that we are growing old in the pursuit of phantasms which have no power to bring us that happiness which is the only rational aim of human existence.

Omar suggested the New Year—the time when most people, who practice that salutary exercise, proceed to their inner stock-taking—as a time when the "old desires" were most likely to be revived, and recommended this as a favorable time for retirement into solitude, for the purpose of devising schemes for their realization.

Every man has, hidden down in the deeps of him, more or fewer of these unexpressed and, frequently, ill-formulated strivings and aspirations—half-forgotten dreams of childhood; grandiose phantasies of adolescence; and the riper, but furtively cherished, projects of his maturer years, to which he purposes to attend "when he has more time."

Beautiful, worthy, glorious "Castles in Spain"! Buried under an avalanche of petty, routine duties, inconsequential contacts and the pressing propinquity of men and women who do not count! Mortgaged to buy the toys which thoughtless ones have exalted to be the emblems of material success! Lost for the lack of a little solitude and of sinews of the soul!

If we would stop a while, in our feverish race after things which do not seriously matter, and devote a few hours or days,

"Where the 'White hand of Moses' on the bough
Puts forth, and Jesus from the ground suspires,"

to a survey of the road ahead, we would be much less apt to come to the end of the period before us, finding our mouths full of sawdust and ashes, and much more likely to finish this day in the long curriculum of human experience with the con-

viction that the effort expended has been productive of adequate results, and that we have added, if only a little, to the world's stock of the solid and enduring verities, as well as to our own.

What could be less wise than to spend one's life in acquiring the means of life, and neglecting to live.—John G. Neihardt.

The Work of McDonagh

IT HAS been said that it is possible for a man to know a subject so well that he is unable to teach it satisfactorily: That is, he, himself, is so familiar with the basic and elementary details that he cannot remember the lack of such familiarity, on the part of his students, and begins his discourse in the middle of his subject.

In studying the writings of Dr. J. E. R. McDonagh, of London, England, one is rather impressed with a feeling of this sort. The ideas presented appear to be of great interest and importance; but one feels as if one were standing at the bottom of a long ladder, whose first ten or a dozen rungs have been removed, so that it is difficult or impossible to gain a foothold for climbing.

We have given a good deal of study to these new theories and are so deeply impressed by their basic and revolutionary character that we are eager to have our readers gain some knowledge of their nature and possibilities, so that they may be given a more extended clinical trial.

This is, however, not especially easy to do. We have spent a number of hours with some of the exponents of McDonagh's methods, in this country, and a few with the eminent Londoner's assistant, Dr. Noel, who attended the International Postgraduate Assembly, in Detroit, last October. All are enthusiastic; but the latter gentleman is very reticent and the former, while eagerly articulate, are not always comprehensible. We have to *dig out* particulars by asking a great many "dumb" questions.

Notwithstanding these difficulties, we have secured a paper by Dr. Le Blanc, which appears in this issue, reciting some of the basic points in technic and some results of the clinical application of these iconoclastic hypotheses. One must, however, face the necessity for learning a new nomenclature and gaining a new viewpoint —as must be done in the study of electrocardiography—but the results give promise of amply justifying the effort involved.

In addition to this, we have the promise of a series of articles by McDonagh himself, the first of which is in hand and will appear soon (probably in February).

If these workers are wrong in their ideas, the only way to prove it is to test them in the crucible of clinical application; and the sooner this is done, and a sound conclusion arrived at, the better.

We invite comments and questions on these new conceptions in pathology and therapeutics, and shall endeavor to pass such communications on to those who will use them to the best advantage in clarifying for us a field of thought which may possibly alter the entire scheme of medical practice.

If anyone can compel you to give up the work you are engaged in, it is not worth doing.—J. Krishnamurti.

The Clinic

IN ADDITION to formal instruction in schools and colleges, three methods are available, whereby a physician may continue his education after he is graduated: The study of books and periodicals dealing with his profession; consultations and conferences with his colleagues; and attendance at clinics.

We are sincerely endeavoring to furnish, in Clinical Medicine and Surgery, a satisfactory variety of material for the latter half of the first method; in *The Seminar*, we have, for a number of years, offered an opportunity for round-table discussions or

conferences, in which all of our readers are urged to take part; now we purpose to complete the picture by bringing the clinical amphitheater into our pages.

The new department, THE CLINIC, inaugurated in this issue, will aim to present, each month, a clinical study of cases of various types, such as would be found by going to a large general hospital. The man presenting the clinic will, figuratively, bring his patients before us (pictures will be used, in lieu of the actual patients, whenever this is practicable), and will discuss them as he would at a staff conference or similar gathering.

We shall be glad to hear the opinions of our readers regarding this new departure; and, particularly, we shall be happy to have those of them who have access to abundant clinical material, make a presentation of a group of similar or related cases, just as they would show them to us if we visited their hospital, sanitarium or dispensary.

ARCTURUS IN THE MORNING

Winter is here, with all his panoply;
But, in the frosty hush of early morning,
Arcturus sheds his mellow gleams on me.
Summer will soon come back, the year adorning.

—G. B. L.

LEADING ARTICLES

Progress in the Study and Treatment of Goiter*

By Israel Bram, M.D., *Philadelphia, Pa.*

DURING the past two decades, progress in the study of goiter has been intensive. Many causal relationships have been ferreted out. Much thought has been given to the discrimination of the various types of thyroid swelling. The prevention of goiter, especially the endemic form, has received widespread attention. The treatment of goiter, still somewhat uncertain, nevertheless has received more study during the past twenty years than during the entire previous period of medical history.

Despite marked progress, however, there is still much to be learned. Goiter is a vast field—a specialty which none other excels in mysteries of etiology and treatment. Indeed, several more decades of concentration and application are essential ere this subject can be placed on a plane that permits satisfactory standardization of views on cause, classification and treatment.

That we may obtain a glimpse of what is yet needful to the army of over five million goiter patients of this country, let us briefly review the progress in the treatment of goiter during the past twenty years.

Classification of Goiter

In the classification of goiter we have made little progress. Were twenty publications on the subject perused by the casual observer, he would find twenty different classifications—a veritable maze of conflicting views. The following therapeutic classification, discussed in my book,† I find very useful in my work.

A.—Non-Surgical Goiter:

1.—Simple hypertrophy } Non-toxic
2.—Colloid goiter }

3.—Puberty hyperplasia } Toxic
4.—Exophthalmic goiter (Graves' disease) }

B.—Surgical Goiter, embracing adenomas (simple and toxic), cystic goiter, and all other forms not mentioned under non-surgical goiter.

From the above we might formulate the following pathological-therapeutic classification:

Toxic goiter	Toxic adenoma (hyperthyroidism).	Surgical goiter
	Diffuse adenomatosis (Goetsch).	Surgical goiter
	Puberty hyperplasia.	Non-surgical goiter
	Exophthalmic goiter (Graves' or Basedow's disease).	Non-surgical goiter
Non-toxic goiter	Simple hypertrophy	Non-surgical goiter
	Colloid.	Non-surgical goiter
	Adenoma.	Surgical goiter
	Cyst.	Surgical goiter
	Fibrous.	Surgical goiter
	Calcareous.	Surgical goiter
	Any combination of the last four.	Surgical goiter
	Inflammation of the thyroid (acute, subacute, chronic).	Surgical goiter
	Malignant disease.	Surgical goiter

The pathologist will observe that the four types designated as *non-surgical* goiter are *unencapsulated*, while the common types of *surgical goiter* are *encapsulated*. Barring malignant disease, thyroiditis and certain rare types of thyroid enlargement, unencapsulated goiters are amenable to non-surgical methods of treatment. Of course, any non-surgical condition, may, through some unusual circumstances, become surgical; and if a thyroid mass causes pressure symp-

*From the Bram Goiter Institute, Upland, Pa.
†Bram, Israel: "Goiter: Nonsurgical Types and Treatment." The Macmillan Co., New York.

toms, because it is intrathoracically located, or if it is located at the base of the tongue, surgery is indicated, irrespective of the type of growth. But these are the exceptions; we are here discussing goiters located in the usual position, above the thorax.

It is my view that, were some such classification as the above adopted—a discrimination based upon therapeutic implications—we should see few, if any, of the commonly observed, disappointed postoperative patients, who still seek in vain the health they expected to regain through thyroidectomy.

Prevention of Endemic Goiter

The incidence of endemic thyroid enlargements—that form of goiter constantly present in certain regions, eminently, in this country, about the Great Lakes and in our Northwestern states—is now largely controlled by iodine prophylaxis. This problem is, however, not quite solved, and the advisability of the universal administration of iodine in drinking water is open to question.

Greater conservatism in the use of iodine would be exercised if it were borne in mind that: (1) Iodine is a potent drug, to be employed only after very careful study of the case in hand; (2) endemic goiter is not necessarily due to iodine deficiency but, as McCarrison and others have pointed out, to unhygienic surroundings, microbic infection of food or water and many other factors; (3) areas regarded as "goiter belts," likewise present sporadic goiter, which is rarely due to iodine deficiency, but often to such complex causes as heredity, infectious foci, intestinal autointoxication, the premenstrual status, adolescence, pregnancy, the menopause and diseases of the gonads, all of which can hardly be cured by the administration of iodine; (4) clinical results prove that iodine, employed indiscriminately, is capable of making small goiters larger and simple goiters toxic; and (5) since the publicity given iodine as a remedy for goiter, we have had more goiters, especially toxic, in our midst, than ever before.

Infectious Foci and Goiter

The causal relationship between infectious foci and thyroid enlargement is still a matter of indecision. In a contribution (April, 1927) on this relationship, based upon a series of 9,864 cases, I pointed out that, in the presence both of diseased tonsils and goiter, we must not promise too much when advising tonsillectomy, but merely suggest the possibility of benefit relating to the thyroid. Disappearance of goiter as a result of tonsillectomy is uncommon. Assuming that diseased tonsils *are* the cause of a given case of goiter, the latter is hardly more likely to be cured by the removal of the offending tonsils than is an attack of rheumatic fever likely to disappear as a result of the removal of causally related tonsils.

The conclusions derived from a study of the above-mentioned series of cases were:

1.—In simple goiter, it is doubtful whether diseased tonsils play an etiologic role. Hence, tonsillectomy, without the administration of additional therapeutic measures, usually fails to cure the patient.

2.—Hypertrophic tonsils, without evidences of infection, are frequently coincidental with simple goiter of the hypertrophic, colloid and hyperplastic types during puberty and adolescence and, if nonobstructive, may remain.

3.—Diseased tonsils appear to play a minor part in the assumption of toxicity (hyperthyroidism) by a previously nontoxic goiter. Tonsillectomy, in these cases, may result in a degree of amelioration of toxicity, but the goiter itself is unaffected.

4.—In exophthalmic goiter, diseased tonsils often play a contributory etiologic role. The major factors are, apparently, the predisposing neuropathic makeup of the individual, superimposed upon which a psychic trauma appears to be the usual exciting cause of the affection. Tonsillectomy in exophthalmic goiter, with the expectation of curing the disease, is usually disappointing; this procedure should be regarded as merely supplementary to more direct therapeutic measures.

5.—Despite the frequent disappointments as to results, diseased tonsils should be removed in all goiter cases. Care must be exercised in toxic adenoma, and especially in exophthalmic goiter, that tonsillectomy be performed at a time when the resultant reaction would appear to be negligible.

The comments relative to diseased tonsils are applicable to infections in teeth, sinuses and elsewhere. Infectious foci, while often etiologically related to thyroid enlargement, are more often coincidental than causal.

Treatment of Simple, Non-Surgical Goiter

Iodine in the *treatment* of goiter is a failure. The popularity of this drug is due, not to its success in treatment, but rather to confusion of the term prophylaxis with the term cure.

In colloid goiter, how can one expect to clear up the mass by giving iodine, when

this drug is known to bring about an *increase* in colloid? Hence, many colloid goiters treated with iodine become larger and produce pressure symptoms and occasionally symptoms of hyperthyroidism. Simple hypertrophic goiter likewise becomes larger, in many instances, when treated with iodine, approaching colloid goiter in size by sheer increase of colloid content.

The basic cause of thyroid hypertrophy and colloid goiter is the call of the body for more thyroid hormone, and the thyroid, in its efforts to supply the demand, undergoes enlargement. Even then the body tissues are not satisfied, for most of these patients present a rather low basal metabolic rate, varying from zero to minus twenty or thirty percent. The logical treatment of these forms of thyroid enlargements consists in: (1) The elimination of all discoverable causes, including the correction of physical and mental flaws in life's habits; and (2) the administration of thyroid substance *under careful guidance*. For obvious reasons, x-ray treatment is as strongly contraindicated as is thyroidectomy. Perfect cure is effected by the above-mentioned measures, within a few months.

Simple Thyroid Neoplasms

Prophylaxis of thyroid adenomas, cysts and the like, consists in adequate attention to the preexisting thyroid hypertrophy or colloid goiter, since nearly every surgical goiter encountered is the end result of neglected non-surgical goiter.

Treatment of thyroid adenomas, cysts and the like, consists in expert thyroidectomy. No other form of treatment is capable of removing these masses.

Substernal or Intrathoracic Goiter

Irrespective of their nature, all goiters dipping down behind the sternum into the thoracic cavity are a menace to health and life. They produce symptoms not unlike pressure phenomena incident to thoracic neoplasms. "Mechanical goiter heart" is the term applied to a heart markedly embarrassed by an interfering thyroid mass. Also, arterial hypertension and asthmatic manifestations are commonly observed phenomena. Treatment consists in early thyroidectomy which, by reason of difficult accessibility of the mass, requires exceeding surgical judgment and skill.

Malignant Goiter

Since sarcoma or carcinoma of the thyroid is a condition superimposed upon an apparently innocent adenoma or cyst, the prevention of malignancy consists in early thyroidectomy of preexisting simple neoplastic goiters.

Cure of malignant disease of the thyroid is exceedingly unsatisfactory. When the diagnosis is obvious, surgical interference is usually too late. The best that can be hoped for in the average case is skilful surgery, supplemented by roentgenotherapy or radium. Occasionally, however, an observer is able to report the survival of the patient for five or more years following these procedures.

Toxic Adenoma (Hyperthyroidism)

Toxic adenoma is a clinical picture resembling the symptomatology of poisoning from the ingestion of thyroid extract or thyroxin, and occurs ten to twenty years after the development of simple adenoma or cyst. The prevention of toxic adenoma consists of the removal, by thyroidectomy, of the simple adenoma upon which toxicity is superimposed. Thyroidectomy is therefore the obvious cure of toxic adenoma.

Toxic Adenoma Versus Exophthalmic Goiter

That there exist many points of similarity between toxic adenoma and Graves' disease is true and may be accepted on the same basis that all fevers present such features in common as weakness, rapid pulse, increased oxidation and loss in weight. The fact that, in both toxic adenoma and Graves' disease, there exist loss in weight, nervousness, palpitation, tachycardia, trembling, fatigability and an increased basal metabolic rate, is insufficient ground for the assumption of Graham and others that the two conditions are different manifestations of the same disease. In our series of approximately 11,000 cases we have been able to differentiate the two conditions, on the basis of the following twenty clinical points (paper published May, 1929): (See next page.)

The matter may be summed up thus: *In toxic adenoma, it is the neck that makes the body sick; in Graves' disease, it is the body that makes the neck sick.*

TOXIC ADENOMA (Hyperthyroidism)	EXOPHTHALMIC GOITER (Graves' Disease)
1.—Family history of simple goiter in 30 per cent of cases. No significant history of nervousness.	1.—Usually no history of simple goiter; history of nervousness, exophthalmic goiter and diabetes, common.
2.—Patient usually of middle age.	2.—Patient usually adolescent or young adult.
3.—Predisposing cause of symptoms is pre-existing adenoma.	3.—Predisposing cause of symptoms is singular peculiarity of the individual.
4.—Exciting cause unknown—not psychic trauma.	4.—Exciting cause usually psychic trauma.
5.—Onset of symptoms very gradual.	5.—Onset of symptoms a few days or weeks following exciting cause.
6.—Goiter had existed years before onset of constitutional symptoms.	6.—Goiter often absent; if present, it occurred some time after constitutional manifestations.
7.—Goiter nodular and usually large, often asymmetric; no throbbing, thrill or bruit.	7.—Goiter usually moderate in size, symmetric, and usually presents throbbing, thrill and bruit.
8.—Tachycardia not marked; somewhat ameliorated by sleep and digitalis.	8.—Tachycardia marked and not tangibly affected by sleep and digitalis.
9.—Hypertension common.	9.—Hypotension common.
10.—Tremor inconstant; somewhat coarser than in exophthalmic goiter.	10.—Tremor constant; finer than in toxic adenoma.
11.—Emaciation slower than in exophthalmic goiter.	11.—Emaciation rapid.
12.—No exophthalmos.	12.—Exophthalmos common.
13.—Fatigability not a major symptom.	13.—Fatigability a major complaint, with giving-way of legs.
14.—Hyperidrosis and dermographia inconstant and not intense.	14.—Hyperidrosis and dermographia common and intense.
15.—No characteristic mental peculiarities.	15.—Characteristic quickening of cerebration and emotionalism.
16.—Iodine therapy rarely results in marked improvement; usually results in aggravation.	16.—Iodine therapy usually results in transient remission.
17.—Thyroidectomy conclusive; recovery complete and permanent.	17.—Thyroidectomy inconclusive; recovery questionable.
18.—No crises nor remissions.	18.—Characteristic crises and remissions.
19.—Following thyroidectomy, no relapses nor recurrences.	19.—Relapses and recurrences after thyroidectomy are common.
20—Spontaneous recovery never observed.	20.—Spontaneous recovery under expert medical attention is the rule.

Evaluation of Basal Metabolism

Since 1918, when basal metabolic studies led to a more careful discrimination between thyroid excitability and other simulating clinical conditions, the diagnosis of thyroid conditions has been placed on a firmer footing. However, the acceptance of metabolic studies as the guide must not always be regarded as unquestionable. In a recent paper, the conclusions personally drawn from a series of over 30,000 metabolism tests indicate that a metabolic study, in a given patient, must not be regarded as a substitute for, but as a supplement to basic information obtained by the senses of the diagnostician. The conclusions are as follows:

1.—Repeated metabolism studies must be made in all cases of actual or suspected thyroid disease.

2.—The taking of a B. M. R. (basal metabolic rate) must always be associated with assurance of perfect technic and perfect physical and mental cooperation on the part of the patient.

3.—The B. M. R. must never be the sole diagnostic factor, but this observation should

be regarded as a valuabe supplement to other laboratory procedures and the clinical experience of the medical attendant.

4.—The B. M. R. may vary widely in apparently normal individuals, particularly in those with peculiar "metabolic temperaments."

The greatest use of the B. M. R. is in the differentiation of atypical exophthalmic goiter without exophthalmos, and goiter from many other conditions which resemble it.

6.—Though the B. M. R., in exophthalmic goiter or Graves' disease, is generally indicative of the severity of the disease, there are many exceptions in which the condition of the circulatory and nervous system are the determining factors, and the B. M. R. is relatively low.

7.—We encounter occasional instances of severe Graves' disease without a heightened B. M. R.; and an occasional patient fully recovered in every way with a persistently high B. M. R.

8.—In many instances, especially during remissions following shortly after thyroidectomy or iodine administration, a normal B. M. R. is no indication of normality of the individual nor of a safeguarded future.

9.—Combinations of "hypo- and hyperthyroidism," usually the result of surgical treatment, frequently yield a normal or subnormal B. M. R., yet the patient is by no means well, presenting myxedema and a modified Graves' disease, each in varying proportion.

The Quinine Diagnostic Test

About eleven years ago, I began making observations on patients with exophthalmic goiter, to determine their degree of tolerance to the ingestion of quinine. Part of the deductions derived were then published, in the nature of a description of the quinine test for patients with exophthalmic goiter. Up to December, 1927, tolerance for quinine was studied in 500 patients.

The technic of the test consists in giving the patient a dozen capsules, each containing 10 grains (0.65 Gm.) of quinine hydrobromide or quinine sulphate, with instructions to take a capsule four times a day. When 20 or 30 grains (1.3 or 1.9 Gm.) have been taken, by persons in whom the thyroid function is normal or deficient, symptoms of cinchonism develop. A sense of fulness in the head, impaired hearing with tinnitus, occasional dizziness and headache and, less frequently, gastric and bladder discomfort are experienced. If, however, the person is suffering with exophthalmic goiter, the daily administration of 30 grains (1.9 Gm.) of quinine may be continued with impunity for months, and often distinct improvement is seen in the clinical picture.

The advantages of the quinine test in exophthalmic goiter are its simplicity, its harmlessness and its dependability. The frequency of error is only 4.4 percent, in the experiences derived from this series.

In 95.6 percent of patients in whom the quinine test was positive, there was unusual tolerance to the ingestion of quinine. In some cases, doses as high as 30 grains were taken three times a day for weeks, without untoward effects In at least 60 percent of these patients, in whom the reaction to quinine was positive, material amelioration of symptoms was observed. Men seemed able to take larger doses than women. Within two or three weeks, an increase in weight occurred in many patients, a lessening of excitability and tremor, reduction in thyroid swelling and exophthalmos, marked lowering of the heart rate and a considerable reduction in the basal metabolic rate.

In many patients the therapeutic effect of quinine seems to resemble the remission-producing results of the administration of iodine, with this clinical difference: Iodine cannot be given for more than two or three weeks without danger of aggravating the symptoms of exophthalmic goiter. Moreover, iodine always increases the thyroid swelling by increasing the colloid content of the organ. Quinine can be given for months, without harm, to patients in whom the test is positive, and its effect on the thyroid gland is that of marked reduction in size.

It must not be construed, however, that quinine, whatever its virtues, is the main factor in the treatment of patients with exophthalmic goiter. A mere drug cannot be depended on for the cure of this disease. Quinine, the basis of the Forchheimer treatment, may be regarded as a valuable constituent in the armamentarium of the experienced internist who has sufficient confidence in himself to treat successfully patients with exophthalmic goiter without resorting to an operation.

When the basal metabolic rate has become normal and all the signs and symptoms of the disease have disappeared, the patient, formerly capable of taking from 30 to 90 grains (1.9 to 5.8 Gm.) of quinine daily, complains of a sense of fullness and roaring in the head, some deafness and, at times, dizziness. The reduction of the dosage even to 15 grains (0.9 Gm.) a day may still elicit evidences of cinchonism. An occasional patient may appear well and still possess a relative immunity to cinchonism; in such instances there appears to be susceptibility to relapse, indicating the need

for further treatment. When, however, a patient, formerly not susceptible to cinchonism, almost abruptly begins to complain of tinnitus and allied symptoms, and when this cannot be traced to other causes, studies on the basal metabolism will indicate that recovery is at hand, and that the patient is ready to resume his or her customary activities.

Etiology of Exophthalmic Goiter

In a series of 3,343 cases of Graves' disease (reported early in May, 1927), studied with a view to conclusions on etiology, the following deductions were made:

1.—Eighty-five percent, or 2,842, presented a clear history of psychic trauma as the exciting cause of the disease. In 167 cases, or 5 percent of the series, there was elicited a history of general or focal infection as the probable exciting cause of the disease. In 133 cases, or 4 percent of the total, the ingestion of iodine or of thyroid extract, in tablets or in the form of obesity "cures," was regarded by the patients as the cause of the symptoms. In 201 cases, or 6 percent, there was no discoverable exciting cause to account for the onset of the disease.

2.—It is felt that, in most instances in which infections appear to serve as the exciting cause and in those in which no exciting cause was discovered, an unrevealed psychic trauma may have been the exciting cause to account for the onset of the disease.

3.—Since psychic trauma appears to be the exciting cause in the vast majority of cases of exophthalmic goiter, it would appear that this factor more closely approaches the solution of the question of its etiology than any other theory.

4.—The predisposition or "soil" upon which the exciting cause is superimposed is usually an inherited and occasionally an acquired peculiarity of the individual.

A New Definition of Exophthalmic Goiter

Since neither exophthalmos nor goiter need be present in otherwise typical instances of Graves' disease, the term exophthalmic goiter as a synonym is confusing and hinders progress. In my series of 3,343 cases, reported in 1927, there was no tangible thyroid enlargement in approximately 20 percent, and in 15 percent no exophthalmos existed. In 9 percent neither exophthalmos nor goiter was observed. The percentage thus atypical would be found considerably greater were it possible to include the many cases in general practice that are undiagnosed, because of the absence of both exophthalmos and goiter.

In 1923, I suggested that, were Graves' disease removed from the classification of goiter and placed in the category of constitutional affections, the thyroid gland would cease to be incriminated as the etiologic factor. The removal of the burden of causation from the thyroid is a procedure with which most investigators are in accord.

Commonly there is elicited the information that one or more members of the family are or have been afflicted with nervousness, diabetes mellitus, Graves' disease, or some other condition of nervous or endocrine causation. Goiter is almost never stressed by the sufferer; it is the nervous factors that are brought fully to the fore and complained of as having existed over a period of years. Prolonged observation impresses one with the constancy of three clinical facts:

1.—Graves' disease, in its active stage,* almost invariably presents an abnormally high basal metabolic rate. Hence we might safely conclude that, whatever its etiology, the disease is a *catabolic* disturbance.

2.—Almost never does a patient with Graves' disease fail to present marked disturbances of the central and peripheral nervous systems. There is a universal speeding up of nerve function; the threshold of emotional reaction is shortened, so that unusual behavior of the patient, asserting itself especially in excitability, is one of the earliest symptoms noted. Autonomic imbalance is evidenced by flushing of the skin, dermographia, sweating and the many signs associated, now with sympatheticotonia, now vagotonia; again, a combination of the two, with one or the other predominating. Hence we are also justified in concluding that the disease is largely to be regarded as one of *nervous dysfunction.*

3.—The endocrine aspect of Graves' disease is of decided interest. Irrespective of whether the thyroid gland is disturbed qualitatively, quantitatively, or both, it is fairly well established that the disease is not *due* to hyperthyroidism. The majority of observers believe dysthyroidism to be a constituent of Graves' disease, since the *nature* of the thyroid hormone appears abnormal. Parathyroid undersecretion appears probable, because of the tremor and low blood-calcium content characterizing the disease. The commonly observed thymus hyperplasia justifies the belief that this organ is usually in a state of hypersecretion. The lowered carbohydrate tolerance is evidence of hypofunction of the internal secretion of the pancreas. Again, gonadal insufficiency is indicated by the commonly-observed amenorrhea and other menstrual disturbances and sterility. Less certainly, but nevertheless with reason, we might state the suprarenal medulla to be in a state of hyperfunction and the cortex in hypofunction; also that the posterior pituitary is in a state of hypofunction while the anterior portion of this gland is in hyperfunction. Hence, to infer that Graves' disease is an affection of *endocrine dysfunction* appears reasonable.

*During a marked remission of the disease there may be no abnormal metabolic rate. In this paper we are discussing Graves' disease in its *active* stages.

From the above paragraphs we might state that Graves' disease asserts itself clinically as a *catabolic, neuro-endocrine dysfunction.* It would thus appear that we are in position to redefine this affection as follows:

Graves' disease is a chronic (rarely acute), neuro-endocrine dysfunction, characterized by an increased basal metabolism, loss in weight, tremor, emotionalism, persistent afebrile heart hurry, weakness, dermographia and usually (not constantly) by hyperplasia of the thyroid gland and by exophthalmos.

Surgical Treatment of Exophthalmic Goiter

Surgical progress in the treatment of exophthalmic goiter has occurred in two directions: (1) Perfection in surgical technic; (2) the preoperative preparation of the patient with iodine medication. This progress has lowered the operative mortality so that, in representative clinics, the rate is almost nil.

We are faced, however, with a marked paucity of information concerning clinical end-results in thyroidectomized cases. While, in toxic adenoma, surgical results are all one could desire, this cannot be said of exophthalmic goiter. The facts are: (1) There is no evidence to favor the view that exophthalmic goiter is due to hyperthyroidism, but it appears likely that the thyroid in this disease, swollen or otherwise, is trying to defend itself against toxic influences originating elsewhere; (2) goiter in Graves' disease is inconstant; (3) iodinization, though capable of changing a hyperplastic thyroid to one of harmless colloid pathology, yet does not cure the disease; (4) Graves' disease and myxedema may occur simultaneously in the same patient; (5) approximately one-third of exophthalmic goiter patients coming my way had been operated upon one or more times, in representative clinics, and appear to be in poorer health than ever before.

The best that can be said of thyroidectomy in Graves' disease is that this procedure, to quote another observer, "May be considered as a grafting of an imperfectly antagonistic disease (myxedema) upon another disease (exophthalmic goiter). The result is a cancellation of some of the manifestations of the preexistent disease."

Thus, in a percentage of cases, thyroidectomy produces a temporary improvement in Graves' disease; but a permanent, perfect cure of the disease by surgery is unlikely.

Medical Treatment of Exophthalmic Goiter

In a recent paper (September, 1929), I reported the end-results of the medical treatment of 2,000 cases of Graves' disease —the largest series thus reported in the literature. These cases were selected from a total of 4,210 records of exophthalmic goiter patients, studied during a period of over nineteen years, ending December, 1928.

Rest, climatotherapy, diet, medication and psychotherapy were the principles of treatment employed. The end results achieved were thus summarized:

> The average time required of the patient away from customary duties while under appropriate medical attention was approximately fifteen weeks. In over seventeen (17) percent of cases no time was lost from customary duties.
>
> Of this series, followed up for from three to ten years, 1,819, or 90.95 percent, are in perfect health; 116, or 5.8 percent, are in good subjective health and restored to social and economic usefulness, though still presenting some exophthalmos, heart enlargement, or both; 65, or 3.25 percent, present myxedema, with or without some exophthalmos and cardiac enlargement—cases in which thyroidectomy had occurred months or years prior to the institution of medical attention.
>
> From these results it would appear that Graves' disease is amenable to appropriate nonoperative management, and that the main difficulty involved is a deficiency of study of the individual *as a whole,* with a consequent spirit of haste manifested by the average medical attendant, who seeks a shortcut to health for his patient.

A detailing of the principles of the medical treatment of exophthalmic goiter is impossible in a limited paper, since this involves varying degrees of individualization, with respect to the type of the disease, age of the patient, severity and duration of the affection, the patient's social stratum, occupation, character and temperament, psychosexual life, susceptibility or idiosyncrasy to medicaments and many other factors. This must be borne in mind: *The patient cannot recover merely by rest in bed and the administration of iodine.*

In conclusion, we may remark that, during the past twenty years, tremendous strides in the study of the thyroid gland and goiter have been made. The subject still requires, however, an elimination of controversy and limitless, intensive, open-

minded research, ere the millions of sufferers can be treated in a uniformly satisfactory manner by the medical profession at large.

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Progress in Chemotherapy

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ALCHEMY, mother of chemistry, arose during the Middle Ages because of an ambition, almost as old as the mind of man itself—the hope of learning the secret of transmuting baser metals into gold. It has remained for the scientists of our own day to accomplish this; the secret was veiled from the medieval searchers. Their labors, however, were not in vain. The Arabians, who possessed themselves of the processes of alchemy, were the first chemists and dispensers of medicine, and it is to Arabian civilization and culture that we owe the foundations of modern medical science. "It contributed directly to the reform of practical medicine," says Baas, "by the exhibition of chemical remedies; indirectly by the union of the natural sciences with medicine, which (on the advice of Aristotle, indeed) had its origin with them."[1]

The first phases of chemistry were, naturally enough, synthetic. It was not until the seventeenth century was well advanced that there was any development of analytic methods. Though the metals—iron, arsenic, quicksilver, copper, sulphur, silver, and gold—were known to possess therapeutic powers and were employed with this end in view from earliest antiquity, it remained for the chemists of our own age to discover and exploit the specific value of these and other elements.

Only a century and a quarter have passed since Serturner succeeded in isolating morphine (1806); five years later, Kurchoff was able to transform sugar into starch; between the years 1818 and 1820, Caventou and Pelletier, in France, isolated strychnine, brucine, quinine and veratrine; the years between 1827 and 1835 saw Dutrochet engaged upon the study of the phenomena of endomosis and exomosis; while Geiger and Hesse isolated atropine in 1833. The period between 1833 and the outbreak of our own Civil War witnessed the devising and perfection of the principal urine tests still found serviceable in practice to

day, with which the names of Fehling, Bence-Jones, Heller and many others will forever be associated.

France, at the beginning of the nineteenth century most potent in all things appertaining to medical science, contributed the work of Jean-Baptiste Dumas, whose life, beginning with that century, extended over 84 eventful years. He it was who isolated methyl alcohol, established the quantitative analysis of air and water, observed the chemical alterations which take place within the egg during incubation, and, working in conjunction with Coindet, made known the importance of iodine in the treatment of goiter (1820).

Great Britain's contribution to this period was enriched by the labors of Thomas Graham, the Scotsman who, although a physicist rather than a chemist, did important work in physiology by his discovery of the laws governing the diffusion of gases, as well as by his investigation of the forces of osmosis and establishment of the distinction existing between colloid and crystalloid substances. His definition of osmosis as *the conversion of chemical affinity into mechanical power,* still remains, as Garrison asserts, the most scientific ever made.[3]

The last quarter of the nineteenth century saw chemistry firmly established as a science, but only then did what we now call *biologic chemistry* have its inception. The greatest names here are those of Pasteur and Koch; but even before them, men less well equipped, perhaps, but still cherishing some faint glimmering of the truth, were seeking confirmation of their questionings.

In 1843, David Gruby observed, while studying the blood of a frog under the microscope, that twisting, spindle-shaped organism, to which he gave the name *Trypanosome* — an auger-like or boring body. In 1878, Lewis saw the same thing in the blood of a rat, but many years had still to elapse before it was established that, though the frog and the rat did not appear to suffer inconvenience from being the hosts of this lively creature, in the blood of other animals such organisms were often far from harmless.

In 1880, Laveran discovered the parasites of malaria, and the following year described them minutely in all their various attributes. The protozoan dysenteries had already been under investigation for some years—from 1860 onward—but the work of Laveran marked an epoch in the investigation of protozoan diseases. Yet it was not until 1903 that the American biologists, Novy and MacNeal, were able to cultivate the trypanosomes *in vitro,* which made advance in experimental research practical and fruitful.

But, long before this, many varieties of trypanosomes had been observed in the blood of different animals and, in 1901, J. Everett Dutton, an Englishman, found them in the blood of men who had been bitten by flies, which had previously attacked infected animals. Thus it was shortly established that the tsetse fly was responsible for the spread of the dreaded "African sleeping sickness," and a strong link was forged in the chain of cause and effect which was to bind the old science of chemistry to its modern ramifications, biology and biochemistry.

The greatest triumph, however, was the discovery of the causal organism of a disease infinitely more widespread and destructive of humanity than that due to the tsetse fly — the *Spirocheta pallidum* of syphilis. This epoch-making discovery was made by Fritz Schaudinn and Erich Hoffmann, though it is Schaudinn, a bacteriologist of the greatest skill and patience, who is deserving of the greater honor. This was in May, 1905. One year later von Wassermann gave to the world the diagnostic reaction for the detection of the *Spirochaetae pallida* in the blood, now everywhere known by his name. The attention of scientists throughout the world was now centered upon the conquest of this hitherto practically invincible disease enemy of mankind.

Ehrlich's Theory

Paul Ehrlich, born in 1854, though trained as a physician, has achieved immortality as a chemist. His earlier work was on the microchemical relation of tissues to dyestuffs. In a study, made in 1885, on the oxygen requirements of the living organism, he applied the idea of selective affinity between chemical substances and body tissues in examinations of the chemistry of protoplasm, and in this connection first outlined his thereafter-famous "side-chain theory."

Without going into details as to the promulgation of this theory, it may be said that, by it, Ehrlich assumed that the molecule of living protoplasm is made up

of a stable nucleus and of unstable, peripheral side-chains or chemoreceptors. These chemoreceptors make possible the chemical combination of this molecule with food substances, which brings about the neutralization of toxins there present by throwing out detached side-chains into the blood. Thus chemotherapy, as we now understand the term, had its birth.

In using dyes, in an attempt to treat trypanosomiasis in mice, Ehrlich found that doses which were too small to bring about complete destruction of the parasites in the blood, often had the effect of rendering these organisms, in the course of several generations, permanently "fast" or resistant to any injury from contact with the dye This observation led him to conclude that protozoan diseases cannot be vanquished by special antitoxins, such as have been successfully employed in diphtheria, but our only recourse is to make use of some chemical agent which is lethal to the parasite, but harmless to the host, and will effect complete sterilization at the initial administration. Speaking in London in 1913, Ehrlich said:

"It was demonstrated that, in these parasites, several different specific chemoreceptors are present. Complete knowledge of all the chemoreceptors of a certain definite parasite might be characterized as the therapeutic physiology of the parasite cell, and this is the *sine qua non* of successful chemotherapeutic treatment. This knowledge is of particular importance because remedies which are adjusted to several different kinds of parasites can have a healing influence on a very large series of pathogenic agents. The larger the number of different chemoreceptors, therefore, which can be demonstrated, the greater is the possibility of successful chemotherapy.

"The first condition of a specific remedy, then, is a certain definite grouping, allying it chemically to one of the chemoreceptors of the parasite. Yet it must not be forgotten that hundreds of substances may fix themselves on a parasite, yet only a few can bring about its destruction. A substance therapeutically suitable must be, not only in the fixing group (that is, be capable of fixation of the *haptophorae*), but must likewise be capable of bringing about destruction of the parasite—that is, be characterized as poisonous or *toxophoric*.

"This representation exactly corresponds to views which we have already long since obtained with respect to toxins, in which we distinguish the presence of a haptophoric group, which conditions the cell fixation and also the formation of the antitoxins, and a toxiphoric group, which brings about the injurious action on the cell. In the case of the highly complicated synthetic drugs, the assumption will have to be made that the haptophoric group and the toxophoric group are not directly connected with each other, but as separate groups are linked with a chemical molecule in the character of side-chains.

"But, as a matter of experience, it has proved that substances which bring about a colossal bactericidal effect in aqueous solutions, even when they are highly diluted, are totally ineffective in therapeutics, properly so called. This is because these disinfectants are more or less powerful cell poisons and do damage to the organism—they are, not only parasitotropic, but also organotropic."[3]

Development of Chemotherapy

Sixteen years have passed since Ehrlich thus described the original conception of chemotherapy, and during that time the world witnessed a conflict which threatened to permanently inhibit all scientific activity. Yet the work which the German scientist inaugurated, when, with his Japanese assistant, Hata, he made public the therapeutic action which his preparation of arsenic could have upon spirochetosis, actually suffered no interference As Hata, speaking reverently of his dead master, said at the dedication of the Peking Union Medical College, "The endeavors of numerous workers in chemotherapy, exerted during the ten years since the discovery of salvarsan, have not been entirely unrewarded, for there has been a perceptible advance in fundamental research, as well as in clinical application."[4]

Though, in the light of later discoveries, the theories of Ehrlich can no longer be adhered to, it must not be forgotten that they were the original impetus, not only to the modern science of immunology, but to chemotherapy, as we now understand that division of medical art. The treatment of infectious diseases by chemical agents is as old as the practice of medicine itself, but the term, as understood by Ehrlich, implies more than this. To his understanding it meant the disinfection of the tissues by chemical agents which were lethal to the parasitic agents but harmless to the host. It does not necessarily imply that the parasites meet death directly, by contact with the drug. The action of the drug may be indirect; it may induce a leukocytosis or similar reaction. Chemotherapy is defined by Kolmer[5] as *the prevention or treatment of disease by chemical disinfection or inhibition of the parasitic causes, without marked or serious toxic effects.* As we have already seen, Ehrlich himself regarded it as the study of the effects of chemical substances upon living cells and, in particular, of the effects of

such substances upon disease-producing organisms. It thus, to his understanding, has to do with substances "not only parasitotropic but organotropic."

Parasitotropism and Organotropism

Though a substance may be parasitotropic without displaying special activity in the killing of parasites, nevertheless such a substance's parasitotropic activity must always bear a most intimate relation to its ability to kill parasites and neutralize their deleterious effects upon the organism—which is just another way of saying, "cure the patient." Yet, as Kolmer points out, a compound may prove therapeutically effective without necessarily involving the questions of parasitotropism and parasiticidal activity or inhibition.

The relation of organotropism to the pharmacologic action of drugs and to toxicology, is, of course, extremely close. It concerns that selective affinity manifested by the cells of the blood, lymph and body tissues for certain drugs. While this selectivity does not necessarily imply chemical union with the affected cells by amalgamation with their protoplasm, it is difficult to conceive of its possessing a mechanism essentially different from that of parasitotropism.

Chemotherapeutic Index of Ehrlich

The relation which parasitotropism and organotropism bear to each other Ehrlich endeavored to set forth in what he termed his "chemotherapeutic index;" that is, the relation between a given substance's power to poison the parasites and its ability to do damage to the tissues of the host. Ehrlich's ideal was to evolve compounds which should possess the least power of harming the host and the greatest power of destroying the parasites. The "index" consisted in deductions made from animal experimentation, and has been expressed in an equation, as follows:

$$\frac{\text{Maximum tolerated dose per kilogram}}{\text{Minimum curative dose per kilogram}} = \text{Chemotherapeutic Index.}$$

Ehrlich's *dosis tolerata* undoubtedly meant "the dose tolerated by the body as a whole." But, as Sir Almroth Wright pointed out not long ago, the terms today are decidedly ambiguous. The tolerated dose might very well mean "the dose tolerated by the leukocytes."[8] Moreover, Ehrlich probably meant "not the, presumably smaller, quantum that can be administered to the diseased; but that, presumably larger, quantum which can be given to healthy men or animals without killing or manifestly poisoning them. But a clinically tolerated dose as thus defined is, in point of fact, in many cases, a dose which weakens or abolishes the antibacterial defence of the body by poisoning the leukocytes." The distinction is thus seen to be of importance. As Wright says, "It is common sense that a quantum of a chemical agent which paralyses the leukocytic defence, must, when administered to an animal organism which is suffering from a bacterial infection, or which is to be exposed to such infection, work for mischief."

Of the minimum curative dose—*dosis efficax*—the same ambiguity is apparent. It may mean a dose capable of sterilizing the entire body; a quantum which would effect sterilization of the blood only; or the full amount of the drug which, even if given in divided doses, will be necessary in order to achieve a satisfactory result.

The ideal of complete sterilization at one dose was relinquished by Ehrlich very soon after the perfection of salvarsan. This may be looked upon as one of the earliest milestones in chemotherapeutic progress. And Ehrlich's own work, as well as that of Morgenroth, shows that the invading parasites tend to become "resistant" with the continued administration of the drug. The present state of the situation was felicitously expressed by Professor Møllgaard of Copenhagen, in addressing the Royal Society of Medicine, in London, last year.[1]

Ehrlich's original view was that an active chemotherapeutic substance acts directly on the parasite by combining with certain chemoreceptors in its protoplasm, thus facilitating the bactericidal action of the toxic group. This view was founded on his and Morgenroth's researches on the "salvarsan-fastness" found in trypanosomes and spirilla. This "fastness" is an increased resistance to a certain chemical compound, developed in a race of parasites by the administration of gradually-increasing amounts of that compound, and may be acquired by passage through a number of animal hosts of numerous generations; but may also be developed in individual animals by the use of sub-therapeutic doses. Ehrlich believed this fastness specific, in part, not for the chemical employed in the particular experiment, but for the entire group of compounds of the identical chemical group,

which are, however, not representative of other groups. To me it appears clear that we must now abandon Ehrlich's idea of a direct bacterial influence due to specific chemoreceptors, but I have no ready explanation of the known facts to offer as a substitute for this theory.

Modern Theories

As chemotherapy has advanced, the whole question of the true nature of chemical treatment has seemed, in retrospect, as much simpler in the days of Ehrlich than it has now become, in the light of the researches of the years since his death. Of the many different theories put forward, two mains ones persist, and the work of practically all investigators may now be ranged under one or the other of them.

The earliest of these theories originated in the salvarsan investigations, and is thus merely a modification of the views originally entertained by Ehrlich. This theory admits that the conception of a direct action of salvarsan and its derivatives, by means of chemoreceptors, can no longer be regarded as a proper interpretation of existing facts. It suggests, however, that the difference between the effects *in vitro* and *in vivo*, the latent period and the importance attached to the condition of the infected organism, may be due to the fact *that the chemotherapeutic compound is transformed into active bodies, by chemical reactions in the organism, and that the bodies thus formed are the true parasitotropic substances which cause the death of the parasites.* Cases in which a cure is not obtained by treatment are explained as being due to an alteration of the physico-chemical condition of the tissues, which inhibits the necessary chemical reactions in the organism.

The continued progress of chemotherapy has brought forward the second conception, which is explained as being derived from experience with "nonspecific therapy," thus owing its origin to work at the bedside, rather than wholly within the four walls of the laboratory. According to this theory, the true basis of chemical treatment is *a general activation of the protoplasm of the cells,* which means that certain substances cause the living cells to react violently to stimuli, to which under normal conditions, their reaction would be much slower. Such activation tends to increase natural resistance and augment specific immunity in infected organisms.

Yet Ehrlich's problem is as yet unsolved, and the increase in our knowledge has, in many of its aspects, but augmented our confusion and uncertainty. Kolmer[8] has summed up the factors on which the mechanism of parasiticidal activity is now believed to depend. These are:

1.—A direct, chemical interaction between the compound or drug as administered or after some transformation in the body, with some protoplasmic constituent of the parasite, resulting in the death or crippling of the latter by interference with its vital processes, such as alternate oxidation and reduction (internal respiration).

2.—A physical or physico-chemical interaction with the protoplasmic colloids, involving precipitation, coagulation, changes in the electrical charge, etc., sufficient for destruction or crippling.

3.—The possible production of new compounds in the tissues, capable of chemical or physico-chemical interaction with the protoplasmic constituents of the invading parasites, rather than the production of these effects by the compound direct, as administered.

4.—The possible production of antibodies by the release of antigenic substances from the parasites.

5.—The stimulation of the processes of oxidation; the production of hyperemia and excitation of reparative action; the production of leukocytosis and mobilization of proteolytic, lipolytic and diastatic enzymes, capable of interfering with the nutrition of the invading organisms or otherwise incapacitating them.

Of the mechanism by which organotropic or toxic effects are produced by chemical agents, for which Ehrlich's relatively simple theory of chemoreceptors can no longer be deemed adequate, Kolmer lists the following processes as adequate explanation, in view of our present knowledge:

1.—By immediate reactions in the blood, like agglutination or lysis of erythrocytes, precipitation of plasma protein or salts, with the production of colloidal shock reactions, embolism, etc.

2.—By direct chemical interaction between the compound or drug as administered, or after some transformation in the body, with some protoplasmic constituent of the fixed body cells, resulting in the death or crippling of the latter by inter-

ference with the vital processes; or by some physical or physico-chemical interaction with the protoplasmic colloids of cells, involving precipitation, coagulation, changes in electrical charge, etc.; either mechanism involving the body cells as a whole, or particular groups and centers, by reason of special affinities, or through the function of elimination.*

3.—By producing excessive hyperemia, cellular infiltrations and other tissue changes; by promoting excessive enzymic activity, with the production of toxic substances from dead or devitalized body-cells or parasites; by promoting or stimulating the activities of parasites, as in the Jarisch-Herxheimer reaction of syphilis, etc.

Relation of Body Cells and Parasites to the Chemical Constitution of Compounds

Much of our chemotherapeutic progress has been along the lines of investigation directed toward rendering chemical compounds more stable. The chemical constitution of such compounds, in relation to parasitotropism and organotropism, has not been brought into conformity with definitely established laws. Alterations in this chemical constitution can materially affect their toxicity, both for host and parasite. Especially in regard to such synthesized compounds of arsenic, mercury, bismuth, antimony and the various dyes, much scientfic energy has been expended toward this end. Therefore, tests for toxicity and parasiticidal power will continue to be necessary, inasmuch as the empiric stage of chemotherapy has not yet been passed.

The study of one group's fundamental relationship to its different members may reveal knowledge of great value concerning such compounds. Systematic study of those alterations, which render a compound more or less toxic or parasiticidal, will not, however, explain its mechanism, because the various chemical and physico-chemical changes resulting from the combination of the compound with the protoplasm of either body-cells or parasites are still unknown to us, except as we may observe them in their characteristic results.

Ehrlich and Hata, in 1910, determined the curative dose for spirochete infection by practical trial and, a decade later, Voegtlin and his associates,* after many months of intensive labor upon the problem of trypanocidal action in arsenic and antimony compounds, can only say that they do not believe that an absolutely accurate index of the clinical value of any compound can be obtained by the methods they employed, even though they do believe that a quantitative comparison of its experimental value *in vivo* can thus be made with other compounds; while most significant of all is the observation that "the results so obtained check, in the order and degree of efficiency, with the curative dose determined by Ehrlich and Hata." Notwithstanding this, the aspect of the entire problem seemed to them to turn from Ehrlich's "chemoreceptor specificity" conception, and to point toward a reaction between the ultimate active form arising from all arsenicals, the arsenoxide form and the stability of the trypanosome molecular aggregate; and they believe that this reaction, "when ultimately explained, will probably prove extremely simple."

Kolmer is of the opinion that, with compounds of mercury, silver and similar metals, the matter of ionic dissociation bears the most important relation to both toxicity for the host and that for parasites. Another subject which he believes deserves further attention is that of the chemical constitution of the protoplasm of body cells and parasites, in their relation to the influence of this constitution on the chemical or physico-chemical interaction between a chemical compound or drug and the living cell.

Methods for Determining Toxicity of Chemical Agents

The toxicity of a chemical agent is usually determined by tests which are carried out upon the lower animals. As chemical analyses must first be carried out, so that the amount of an element in a given compound is determined before it is used for experimental purposes, it is frequently possible to estimate the probable toxic dose for such an animal. These animal tests, if carried out under the most rigorous routine, may be relied on to give a fairly accurate concept of the pharmacologic, toxicologic and parasiticidal activities of certain drugs or compounds, when they are introduced into the human body.

Yet animal experimentation is sharply limited in its applications, and, therefore, empiricism is still important and must always

*This approximates the theory of J. E. R. McDonagh.—Ed.

be reckoned with in computing chemotherapeutic progress. Animal experimentation has found an especial usefulness when drugs have had to be synthesized for the purpose of intravenous medication. New compounds, once biologically tested and standardized for the treatment of a certain infection, may then be used in a related disease, without running an unwarranted risk.

But, in many instances, the lower animals have proved immune to certain infections prevalent in man, so that the responsibility for ascertaining relative toxicity and therapeutic effect of drugs designed for the treatment of such infections will have to rest solely upon the pharmacologist and therapist. And in any event, even if a drug has been completely tested upon animals for its toxicity and therapeutic activity, it is essential that every precaution should be observed when it comes to applying the results of such observations to man. We must make due allowance for the differences between the physiologic functions of man and the rats, mice, guinea-pigs, cats, dogs and monkeys available for these tests; we must take into consideration their peculiar diet, seasonal variations, natural resistance and the individual idiosyncrasies which affect their natural defenses. By extending the experiments as widely as circumstances allow, we may arrive at a fairly accurate estimate. There is wisdom in Sollman's statement: "If a given poison affects all species alike, it may be concluded that its action on man is also the same."[9] Yet errors continually creep in when we attempt to apply such experimental knowledge to disease, as manifested in the human organism.

The Hygienic Laboratory, at Washington, D. C., has established a method for testing arsphenamine and allied compounds —an "official rat-test"—which is used as a standard in this country.

While rats do not show some of the earlier or immediate toxic reactions displayed in the human subject, such tests are able to establish the maximal tolerated dose (M. T. D.), the minimal lethal dose (M. L. D.), and the phenomena known as "early reactions" and "late reactions." These are, of course, more or less influenced by the animal employed for the test, the concentration of the solution of the toxic agent, the route of administration, the rate of injection (in intravenous work), the resistance of the particular species, etc.

It is the **maximum tolerated dose,** which is, unquestionably, of the greatest importance in chemotherapy. It is usually determined by administering, to a series of rats or other animals of approximately the same age, weight and general condition, single doses of increasing amounts per kilogram of weight, of a solution of a specified concentration, at a specified rate and by a specified route, in order to determine the largest amount, per kilogram of weight, which at least 60 percent of the animals can endure for periods of from ten to fourteen days The duration of life is the standard by which the test is measured and its results ascertained, ten to fourteen days being allowed for "late reactions."

The **minimal lethal dose** is determined in like manner. It represents the smallest amount, per kilogram of body weight, which will cause death in at least 60 percent of the test animals, either immediately or within a specified period of from one to twenty-four hours. Usually but a single dose is given, but in order to obtain data of scientific value, method and details must conform to the standard. It is unnecessary to enumerate here the many factors which influence toxicity and therapeutic tests in the lower animals; important factors influencing these attributes of compounds when administered to man are age, body weight and general systemic condition.[9]

The Application of Chemotherapy

Modern chemotherapy is an outstanding development of the present medical era. If we ignore its scientific worth in the realm of medicine, its importance as an economic factor is still overwhelming for, by the advances in the control of tropical diseases alone, it has made a priceless contribution to the advancement of civilization. One has but to name the mycotic and metazoan diseases, those due to invasion of spirochetes, of trypanosomes and a host of others, whose etiology is still disputed or wholly unknown, to realize how intertwined with man's progress, in the parts of the world where these maladies are prevalent, has been the advance of chemotherapy to attack and master them.

Bactericidal compounds have played but an insignificant part in the conquest. Hardly a trace of specific therapeutic activity can be attributed to any except quinine and its derivatives, the resorcin

compounds, acridine, fluorescein and triphenylmethane dyes. The chief chemical agents which have proved their worth are the compounds of mercury, arsenic, antimony, bismuth, the iodides, gold, silver, strontium, calcium, iron, emetine and chaulmoogra oil. The method of their application must of course, be governed by differences of individual equation, whether they are employed in prevention or treatment.

It is of paramount importance in the administration of organotropic compounds that the *chemodynamic balance* be maintained.[21] This can be accomplished by attention to the principles involved in: (1) The absorption and distribution of drugs; (2) the penetration or surface modification of cells by drug molecules; (3) the forms in which drugs enter the cells; and (4) the general effect upon the cells, brought about by dynamic contact with the drugs. Yet, in addition, we are still in want of a new theory which will enable us to define and understand the mechanism by which reactions, inter- and intra-molecular, are brought about.

"Buffer solutions" are likely to play a most important part in the chemotherapy of the future. They supply a medium through which we are able to attack parasites, without materially injuring the body-cells. The buffer systems of the blood will, under normal conditions, maintain a hydrogen-ion equilibrium. Should there be any great deviation from the normal, stabilization of the relation between the reaction (pH) and the ratio of buffer acid to buffer salt will be essential.

In intravenous therapy, compounds of heavy metals should be so buffered as to enable the organism to tolerate larger dosage and maintain it in the circulation over longer periods By the law of mass action, it is established that the velocity, in either direction, of this reversible reaction is proportional to the concentration of the reacting constituents. Thus, any marked deficiency in the buffer solution of the indicated therapeutic agent injected, or in the buffers of the blood, produces a condition known as *colloid* or protein *shock*. Arsphenamine dermatitis may be cited as a manifestation of this reaction. Empirically, it has been demonstrated that sodium thiosulphate, cesium eosinate or tartar emetic is indicated in these reactions.

Discussion

The introduction of a new chemotherapeutic compound, which possesses a near-specific action upon parasites invading the human organism, should be regarded as an event of first importance in the realm of medicine.

In 1820, the alkaloid quinine was discovered and advanced as a specific drug against the parasites inducing malaria. In 1910, Ehrlich and his associates heralded to the world their discovery of salvarsan—an ideal for *therapia magna sterilisans*. Subsequent experience with this and allied arsenicals has demonstrated that the perfect sterilizing drug yet awaits discovery. The researches of the past fifteen years, with compounds of bismuth, antimony, arsenic, mercury and the various dyes and with such drugs as quinine, plasmochin, sodium hydnocarpate and emetine, have given great impetus to the science of chemotherapy and stimulated its progress.

How to administer chemotherapeutic agents so as to secure the best results, is still a mooted question among medical workers. The epifascial and intramuscular injection are the most popular routes of administration for many compounds. Intravenous administration has given splendid therapeutic results with some of the metallic compounds, such as mercurosol, novasurol, mercuric oxycyanide, flumerin and metaphen. Likewise with arsphenamine and allied drugs; with acridine, fluorescein, phenolphthalein and the triphenylmethane dyes and their compounds; the antimony compounds; likewise potassium tartrobismuthate and sodium iodide.

Such combinations as: (1) Arsenic with mercury; (2) bismuth, arsenic and iodides; (3) bismuth and arsphenamine, will be found to remain in the circulation longer than when any single drug is employed, and they also appear to have greater spirocheticidal power than when employed alone.

The dosage in specific intravenous therapy is governed by the following law:[22] In *acute specific diseases*, dosage administered in direct proportion to the virulency produces in the organism a defensive reaction in the same ratio; in *chronic specific diseases*, dosage given in reverse proportion to the degree of degenerative change produces regenerative processes in direct ratio.

Many injected metallic compounds are probably indirect in their action; while direct disinfecting ability may be attributed to certain of the dyes. Failure in treatment is probably due to mistakes in dosage or inability of the organism to react to the parasitotropic substances.

Many problems remain to be solved, and progress in chemotherapy would be greatly aided if the United States were to act upon the suggestion thrown out by Voegtlin, of the Public Health Service, and others, who advocate the establishment of an institute similar to that projected by Ehrlich, wherein facilities would be provided enabling American scientists to make contributions to the science of chemotherapy which would rank with Ehrlich's introduction of salvarsan. It is the hope of everyone interested in this phase of medical progress that this plea will not go unheeded.

Summary

1.—The history of practical medicine includes the development of chemotherapy. Early in the 20th century the science of chemotherapy arose, largely through the work of Ehrlich. Progress in the science has, however, proved many of Ehrlich's conceptions to be erroneous.

2.—The conception prevailing at present is that, when administered, a chemotherapeutic compound is transformed into active bodies by chemical reactions in the organism, and that the bodies thus formed are true parasitotropic substances which cause the death of the parasites. Another theory is that chemotherapy induces a general activation of the protoplasm of the cells, this activity tending to increase natural resistance and augment specific immunity in infection.

3.—The chemical constitution of compounds has not been made to conform to formulated laws in relation to parasitotropism and organotropism.

4.—Animal experimentation has proved an important adjunct to chemotherapy, but it has its limitations, so that empiricism still enters largely into the progress this science has been able to attain.

5.—Chemotherapy finds its application in a multitude of protozoan diseases, and has made great strides in the clinical employment of such compounds as arsphenamine, and in all forms of disease which adapt themselves to treatment by topical and systemic medication.

6.—Chemotherapy stands, today, as one of the greatest achievements of modern medicine.

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The Habit of Perception

The value of learning to look at all phenomena closely and to learn the habit of mind which excludes nothing, need not be dwelt upon, but few are aware of how much it adds to the beauty of nature to acquire this. For to learn to see everything and to notice the changes of light and tints of sun and cloud and leaf and flower, is to insure yourself new and never-failing sources of pleasure.—Dr. S. Weir Mitchell.

The Management of Edema in Cardiac and Renal Disease*

With Special Reference to the Newer Diuretics

By L. E. Verity, M.B. (Tor.), F.A.C.P., *Battle Creek, Michigan*

EDEMA may be defined as a pathologic condition in which there is excessive accumulation of fluid in the tissues or cavities of the body. In spite of the abundance of literary material on this subject, it is impossible, in the present state of our knowledge, to give an adequate explanation of all the phenomena associated with this condition. Those desirous of delving into the physiologic and pathologic processes involved are referred to the excellent monograph by Leo Loeb.[1]

I have selected the following cases of cardiac and nephritic edema as illustrating the method of management and particularly the use and results of the newer diuretics.

Case Reports

Case 1: F. H. S.; age 51; admitted to the Clinic, February 5, 1929.

Family history, negative, except for one sister who has hypertension.

In early life he had measles, mumps, chickenpox and a moderately severe attack of scarlet fever, with no complications; pneumonia at 16; inguinal hernia at 22, and he has worn a truss ever since.

In 1913, he gave a history of severe colicky pain in the right back, radiating down the course of the ureter and requiring morphine for relief. In 1917, the urine showed pus and blood and a small stone, about one-eighth of an inch in diameter, lodged in the ureter, but passed about ten days later. Following the passage of this stone, urine examinations have failed to show any pus or blood cells.

For a number of years, he has had some wheezing in his chest; but about two years ago he first noticed dyspnea on exertion and some edema of the ankles. This condition gradually increased, so that six months later he was forced to go to bed for a period of a month to get rid of the edema. Ten weeks ago the condition recurred, more severe than formerly, and he had orthopnea, with a hacking cough and mucus expectoration. This last attack of decompensation was brought on by an attack of influenza, and his general condition was greatly aggravated by taking osteopathic treatments to the abdomen to "cure" the enlarged liver.

Physical examination shows a man of medium size, with musculature fairly well developed; the skin and mucous membranes are cyanotic; the pupils are regular in size and react well to light and accommodation; the tonsil fossae are negative; the teeth are in poor condition. Examination of the *lungs* shows considerable congestion over both bases. The apex beat is diffuse and palpable 2 centimeters outside the nipple line. There is considerable enlargement of the heart to the left, but no evidence of valvular disease. The *blood pressure* is 210/130. The *liver* extends 13 centimeters below the costal margin. The *spleen* is just palpable on inspiration. There is no evident ascites, but considerable edema of the feet and legs, extending well up to the thighs. The *cardiographic tracing* shows an inversion of the T wave in leads one and two, with spreading of the QRS complex. The *urine* was negative, except for a trace of albumin, with negative microscopic findings. The *Wassermann test* was negative. *Blood chemistry:* Non-protein nitrogen, 42.9; uric acid, 4.3; sugar, 90 milligrams per 100 cc.; alveolar CO_2 tension, 33; acetone + + +. *Blood*: Red cells, 4,860,000; white cells, 7,500; hemoglobin, 92 percent (Dare). The *fundus examination* shows well-marked retinal arteriosclerosis.

Diagnosis: Hypertensive heart disease, with congestive failure: Chronic, passive congestion of the lungs and liver: Cardiac dilatation and hypertrophy.

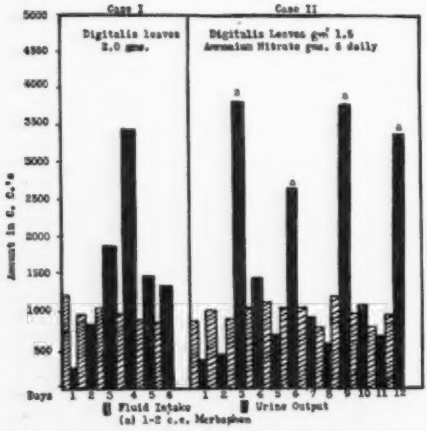
Treatment consisted of rest in bed, a bland, low-salt diet, with fluid restricted to 1000 to 1500 cc. daily. Morphine, grs. 1/6 (10 mgm.), was given to produce sleep the first two nights, and thereafter, 1½ grs. (0.1 Gm.) of phenobarbital. Digitalis leaf was prescribed in 1½ gr. (0.1 Gm.) tablets every four hours, until signs of digitalis action appeared.

On this regime, in fourteen days he was edema-free, and the liver had receded under the right costal margin. He was discharged, advised to continue on small doses of digitalis, and given instructions with reference to rest, diet, etc.

Comment: Each case of cardiac decompensation should receive the benefit of complete rest, salt-free diet, restricted fluid intake and digitalis, pushed to the physiologic limits for that individual, before the various xanthine or mercurial diuretics are used. Morphine is indispensable during the first few days, and should be given in doses sufficient to control the restlessness and produce sleep.

When the edema has progressed to the stage where the limbs are hard and rigid, or when the abdomen is tense, little diuretic results can be expected from digitalis alone. Diuretics are of little avail in removing fluid accumulated in the pleural cavities. If this condition has advanced sufficiently to

*From the Battle Creek Sanitarium Clinic.



embarrass the heart's action, the fluid should be removed mechanically.

When these signs of decompensation have disappeared, it is important that the patient be given instructions regarding rest, diet and proper amount of exercise. Small, continued doses of digitalis are of benefit and frequently are necessary to prevent the return of the edema.

Case 2: M. K.; age 41; male; white; Hebrew. Admitted to the medical service September 18, 1927, complaining of marked dyspnea, swelling of the abdomen, edema of the legs and oliguria. His father died in an insane asylum at 47, cause unknown; mother died of cirrhosis of the liver, at 36; two brothers and two sisters are living and well.

He has had none of the usual childhood infections and, until the onset of the present illness, has always been healthy, except for a mild attack of pneumonia at 27 years. Edema first appeared in 1926. Previous to this, for six months he had complained of dyspnea, nycturia and moderate hypertension. Gradually decompensation became more marked and, between 1926 and 1927, he spent several months in various hospitals.

Examination showed a short, heavy, adult male, lying propped up in bed, orthopneic, with some cyanosis of the mucous membranes and extensive edema of the legs and thighs. Some dulness, but not flatness, on percussion at both lung bases, with numerous moist, crackling rales.

The *heart* was extensively enlarged, the apex beat visible and palpable 2 cm. outside the midclavicular line. The orthodiagram showed increased heart size amounting to 50 percent, all dimensions being increased. The heart sounds were soft, and there was a slight, soft, systolic murmur at the apex, not transmitted; pulse 115, gallop rhythm. *Electrocardiograph* tracing showed tachycardia, prolonged PR interval, left heart preponderance and low voltage, with poor T waves in all leads

There was an extensive ascites and some edema of the scrotum. By dipping into the abdomen, the liver edge was palpable 8 cm. below the costal margin. *Blood pressure* was 190/130. The *urine* was acid, varied in specific gravity from 1.006 to 1.023, and showed albumin + + + and many hyalin and granular casts, but no red-blood or epithelial cells. *Blood*: red cells, 4,880,000; white cells, 9,600; differential blood count normal; hemoglobin, 92 percent (Dare); Non-protein nitrogen, 34.4; sugar, 90 milligrams per 100 cc.; alveolar CO_2 tension, 36; acetone, none.

Diagnosis: Hypertensive heart disease with decompensation.

The *treatment* consisted of rest in bed, a Karell diet for four days and, following this, a bland diet with total fluids limited to 1,200 to 1,500 cc.

As the patient had been taking digitalis steadily for several months, at times discontinuing this on account of nausea, we felt that this drug would not help us greatly in eliminating the fluid. Six (6) grams of ammonium chloride was prescribed, daily for three days, and following a 0.5 cc. intramuscular injection of **merbaphen**, he was given 1 to 2 cc. of that drug, intravenously, every fourth day.

The diuretic response is shown in Chart II, with total weight loss of 45 pounds. The ascites entirely disappeared; the edema of the legs also, except for slight pitting at the ankles on pressure; the dyspnea and the patient's general condition were much improved. He was advised to continue on his rest regime, with a bland, low-salt diet, fluid intake limited to approximately 1500 cc. and 2 grains (130 mgm.) of digitalis leaf daily.

Comment: Saxl and Heilig, in 1920, first described the use of **Novasurol** (merbaphen) in the treatment of chronic, persistent edema. This drug contains 33.9 percent mercury, and 1 cc. contains one grain (64 mgm.) of the drug. In our experience, the best results are obtained when the drug is given intravenously in 1 to 2 cc. doses. Jacobs and Keith have shown that ammonium nitrate is a suitable substitute for ammonium chloride, is nontoxic and is less likely to cause nausea than is the chloride. The combination of ammonium nitrate and merbaphen works much better than either drug alone.

Salyrgan has more recently supplanted merbaphen, because of its relative freedom from toxicity, even though it contains a slightly higher percentage of mercury (36 percent). The diuretic response is most marked during the first ten to fourteen hours, and rapidly returns to normal during the following 24 hours. The drug acts both on the kidneys and on the extra-renal tissues. For a short period after administration, the action on the tissues predominates, as shown by the dilution of the blood; but for the greater part of the diuresis the blood is concentrated, and the action

on the kidneys is more important. (Crawford and McIntosh).

Various authors have reported complications in the form of gingivitis, stomatitis, albuminuria, hemorrhagic colitis, constitutional reactions with fever, collapse and even death. Agnew, while in Germany, observed necropsies on eight cases revealing hemorrhagic colitis due to merbaphen. If the drug is given only in selected cases, and particularly if the patient is first tested with a preliminary dose of 0.5 cc., intramuscularly, dangerous complications are not so liable to occur. We feel that acute nephritis and any renal insufficiency with a moderate or high degree of nitrogen retention, are absolutely contraindicative to the use of merbaphen or Salyrgan.

Case 3: Male, age 41, white, American. Admitted to the medical service June 8, 1928, complaining of dyspnea, palpitation and cough of six months' duration. There was no history of heart disease, hypertension or nephritis in the family. Measles, chickenpox and mumps were his only childhood infections; malaria at 15 years of age; syphilitic infection at 22 years of age, no secondaries.

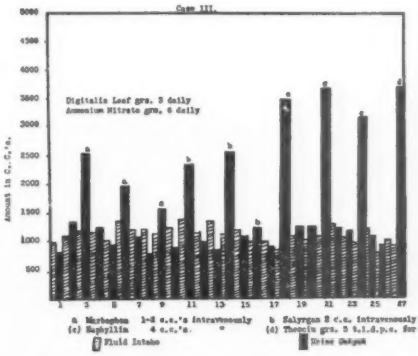
Previous to December, 1926, he was entirely free from symptoms. At this time he noticed an onset of dyspnea and cough. He had been told previously that his tonsils were infected, and so he consulted the family physician relative to a tonsillectomy. On examination, his heart was discovered to be the cause of his symptoms and, following two weeks in bed, he returned to work. A blood examination gave the findings of a strongly positive Wassermann reaction, and large doses of potassium iodide and protoiodide of mercury were taken orally. A month later, following an acute cold, he had a return of his former symptoms, and was again in a hospital for a period of two months. He made a good recovery and was advised to take things easy. In January, following a cold, his dyspnea returned, more severe than before, and orthopnea as well. Palpitation and cough, with mucoid expectoration, were troublesome symptoms. In spite of all treatments these symptoms continued until the present examination.

The *entrance examination* showed a man of medium size, with fairly well developed musculature; the skin, particularly over the face, was of a slightly ashen-gray hue; there was no cyanosis. The pupils were irregular, the right larger than the left, and both reacted sluggishly to light, but well to convergence. Numerous moist rales were heard on both sides, on the left extending to the 7th rib posteriorly. *Heart*: The apex beat was visible and palpable 2.5 cm. outside the mid-clavicular line; heart sounds, distinct, no murmurs noted; pulse rate, 108, slight gallop rhythm; aortic second sound, loud and booming—the so-called "*bruit de tabourka*"; the brachial, radial and femoral arteries, thickened on palpation.

The liver edge was felt 2 cm. below the right costal margin; the left lobe and the spleen, not palpable; no evidence of shifting dulness in the abdomen; extensive edema of the lower extremities; superficial and deep tendon reflexes, exaggerated; plantar responses, normal; Romberg sign, negative; blood pressure, 180/120.

Several *urine* examinations showed a specific gravity varying from 1.013 to 1.020; a slight to a heavy trace of albumin, with an occasional hyalin cast; no red blood or epithelial cells. *Blood*: Red cells, 4,530,000; white cells, 8,400; hemoglobin 84 percent (Dare); Wassermann test with both Kolmer and Kahn antigens, ++++; non-protein nitrogen, 27.6; uric acid, 4.4; sugar 100 milligrams per 100 cc.

Diagnosis: Syphilitic heart disease with decompensation.


Case III.
Digitalis Leaf grs. 3 daily
Ammonium Nitrate grs. 6 daily
Amount in c.c.'s.
a Merbaphen 1-2 c.c.'s intravenously
(c) Euphyllin 4 c.c.'s. "
b Salyrgan 2 c.c. intravenously
(d) Theocin grs. 5 t.i.d.p.c. for
Fluid Intake
Urine Output

Treatment consisted of rest in bed; low-salt diet; fluid restricted to less than 1,500 cc. daily; digitalis leaf, 6 grains (325 mgm.) daily for three days, and then 3 grains daily, stopping the drug completely when nausea first appeared. On this regime, the daily output of urine, measured from 700 to 1,250 cc., and there was practically no change in the patient's condition.

He was then given 15 grams of ammonium nitrate daily and, following a preliminary injection of 0.5 cc. intramuscularly, 2 cc. of **Novasurol** (merbaphen) were given, intravenously, every fourth day for four injections.

At first, there was a fair diuretic response, but later very little, so that, with the last injection, he eliminated only 1,400 cc.—practically the same as on digitalis therapy. With 1 cc. of Salyrgan, intravenously, a slightly better response was obtained; and with 2 cc. his elimination reached 2,500 cc.

Comment: **Metaphyllin** (euphyllin), by mouth, has not, in our experience, been an effective diuretic in these cases. Two (2) cc. of Metaphyllin, prepared for intramuscular injection, was diluted to 10 cc. with sterile water and given intravenously. The urinary response was only 1,200 cc. Two (2) cc. of this drug was then given undiluted, intravenously, on three occasions, with an interval of two days, and the urinary responses were 3,300, 3,500 and 2,800 cc., respectively. On several occasions, we have given Metaphyllin intravenously, undiluted, without any untoward effects, and

always with good diuretic response. **Theocin** (synthetic theophyllin) by mouth, in 5-grain (325 mgm.) doses, three times daily for two days, gave a response of 3,500 cc. On each occasion, however, the drug caused such severe nausea and vomiting that it had to be discontinued. **Theophyllin,** as a rule, causes a much better diuretic response than theobromine or its compounds.

In spite, however, of the use of these various diuretics, we were not able to free the patient from edema and, as the condition progressed, the diuretic response became less and less.

*Case 4:** Male, age 49; admitted to the Clinic, March 1, 1929.

Family history, negative.

In early life he had measles, mumps and whooping cough—no other sicknesses. In 1922, he had a fall and fractured five lumbar vertebrae; recovered in six months. Roentgenograms since then have been negative.

A year ago an examination revealed the presence of hypertension and albuminuria. At this time he was symptom-free. Six months ago he first noticed a beginning edema of the legs, gradually spreading up to the thighs, into the abdomen and, recently, he has noticed some bloating of the face. He complains, also, of tiring easily, shortness of breath on exertion and scanty urination.

Physical examination shows a rather short, heavy man with a sallow, pasty complexion and marked general anasarca. There was no enlargement of the heart and no evidence of valvular disease The pulse was regular, 108 to the minute; blood pressure, 170/100; very marked edema of the abdomen and scrotum.

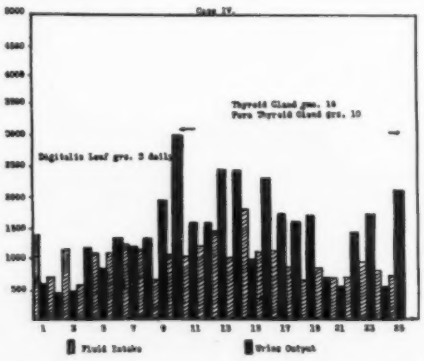
The *urine,* on admission, showed a specific gravity of 1.033; 38 percent of albumin, by volume, with two to three hyalin and finely granular casts; no red blood cells. The phenolsulphonephthalein test shows an elimination of 33 percent in two hours. The non-protein nitrogen was 35.4; uric acid, 2.5; serum globulin 1.7. Basal metabolic rate minus 27 and minus 25 (Du Bois).

The red blood cells varied from 1,270,000 to 2,850,000, with hemoglobin varying from 49 to 61 percent; Wassermann test, negative; Blood cholesterol, 300.

The *treatment* consisted of rest in bed with low-fat, high-protein diet, running the protein as high as two grams per kilogram of body weight; thyroid extract, gradually increased until the patient was taking 15 grains daily. Under this regime, in 16 days, the edema practically disappeared and the albumin was reduced to approximately 11 percent, by volume.

In spite of the marked improvement in the loss of fluid and the albuminuria, the anemia remained unchanged. Liver extract was used, but without results.

Comment: The clinical picture here presented shows a disease of insidious onset



with oliguria, generalized edema, marked albuminuria, hyalin and occasional granular casts without epithelial or bloody casts, hypercholesteremia, low basal metabolic rate, inversion of the normal albumin-globulin ratio, marked anemia and hypertension. We believe, then, that this is a case of *nephrosis,* complicated by chronic glomerular nephritis.

No diuretics were used in the treatment, and the edema was entirely eliminated by means of the high-protein diet and thyroid extract. In cases of true renal diseases, the various diuretics, as a rule, are ineffective. Where there is a combination failure of both heart and kidneys, the extent of the diuresis following the administration of any diuretic will depend almost entirely on the relative part played by the heart in the production of the edema.

The continued use of diuretics in the presence of nephritis, particularly in those cases with nitrogen retention and poor elimination, should be guarded against.

Summary

1.—Rest, a bland diet with restricted fluid intake, the proper use of digitalis and morphine, as required, make up almost the entire treatment of cardiac decompensation.

2.—When sufficient diuresis is not produced in the above manner, such diuretics as Theocin, Diuretin (theobromine-sodium salicylate), theophyllin, Metaphyllin, etc., may be used.

3.—It should be remembered that merbaphen and Salyrgan contain high amounts of mercury, and toxic reactions do occur. These toxic effects may frequently be avoided by a preliminary injection of 0.5 cc. of the drug, intramuscularly, followed the next day, if no unpleasant results are

*The author is indebted to Dr. M. J. Capron for permission to use his records in this case.

noted, by an intramuscular or intravenous injection of 1 to 2 cc.

4.—The diuretic action of merbaphen and Salyrgan is usually enhanced by ammonium chloride or ammonium nitrate therapy.

5.—All diuretics give better results when the patient is partially or completely digitalized.

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Present-Day Treatment of Neurosyphilis*

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MUCH has been done in an endeavor to find some specific or other agent which will benefit patients with syphilis of the nervous system. The prognosis of paresis, a few years ago, was entirely hopeless. The physician prepared the relatives of the victim of this disease for a fatal outcome in a comparatively short space of months or years. The patient was placed in a hospital for the insane, where only palliative treatment was instituted, making his miserable existence as comfortable as possible during his remaining days.

Today the medical profession is taking a different view. Numerous forms of fever and chemotherapy have been intensively applied and, as a result, paresis has been taken out of the realm of utter despair and hopelessness to where the prognosis is more hopeful as to life and comfortable existence. Modern therapy of neurosyphilis has, however, not been practiced long enough to say what the ultimate prognosis will be.

The aim of the neurosyphilologist is to restore the patient to an economic status, even though this is below that held before he became physically or mentally incapacitated. For example, a man, before the onset of his psychosis, was a bank cashier; his subsequent position, after going into a state of remission, was that of a house-to-house canvasser.

Occasionally, complete, prolonged remissions take place without the socalled specific therapy. These remissions are occasional, but usually of short duration, while those the result of treatment are lasting and often complete.

The variations in the symptomatology of paresis are, of course, dependent upon the pathology—whether it is meningeal, vascular, parenchymatous, or a combination of these. When the last-named form of involvement predominates, the prognosis is least favorable. Inasmuch as cases of paresis, like other forms of diseases, show individual variations, it is unwise to lay down any definite set of rules for treatment. Before treatment is begun a certain routine should be followed:

ROUTINE BEFORE TREATMENT

A careful history should be taken, ascertaining the duration of the disease and any subsequent symptoms or syndromes which are indicative of syphilis. If the history is positive, the type, length and amount of previous treatment must be ascertained. It is usually difficult to get a definite history, and requires a great deal of patience and tact.

A physical, including a neurologic, examination is essential to elicit the objective findings and thus locate the sites of lesions produced by the disorder. This would also include an examination of the eye grounds and other examinations of the special senses. X-ray examination and cardiography may assist in the diagnosis of cardiovascular disorders.

The mental condition should be thor-

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oughly analyzed, to assist in determining the stage of the disease, the future course of treatment and the probable prognosis.

Confinement in a mental hospital or sanitarium may become imperative. Many cases of mild paresis can be treated successfully in general hospitals, if properly trained nurses are available.

The serologic reactions of the blood and spinal fluid are among the most important adjuncts in the diagnosis of late syphilis of the nervous system. These findings may not be entirely conclusive, but are often indicative of the stage, as well as the type, of syphilis.

It is my endeavor to set forth in this article, primarily, my hospital experience with treating neurosyphilis and the observations made of other methods now in use. The therapeutic armamentarium now at our disposal is varied, yet, by elimination, those methods that have given good results in paresis are few.

Forms of Treatment

The active treatment of general paresis may be conveniently classified into two large general groups; namely, *pyrexial* and *chemical*. *Pyrexial treatment* of neurosyphilis has been applied most extensively during the past five years, and the agents most commonly used to induce fever are:

1.—Disease producing:
   (A) Malaria (*Plasmodium vivax*).
   (B) Sodoku (*Leptospira morsus-muris*).
   (C) Relapsing fever (*Spironema obermeieri*).
2.—Bacterial proteins:
   Typhoid vaccine (singly or in combination with paratyphoid "A" and "B").
3.—Non-specific proteins:
   (A) Nuclein.
   (B) Skimmed milk.
4.—Diathermy.

Chemotherapy consists of a large armament of chemicals, yet they can be reduced to a very few, if those are taken which have yielded good results in this stage of syphilis. The chemicals which have been used most extensively are:

1.—Arsenicals:
   (A) Arsphenamine and its derivatives.
   (B) Tryparsamide.
2.—Bismuth, salts of.
3.—Mercury:
   (A) Salicylate (insoluble).
   (B) Succinimide (soluble salt).
   (C) Inunction (metallic mercury).

Pyrexial Treatment

The cases which are mainly selected for pyrexial treatment are those who are fairly robust, or those with a resistant form of syphilis who have not responded well to chemotherapy. It is not recommended for individuals who have myocarditis, active tuberculosis, advanced renal disease, nor for patients who are physically weak or badly deteriorated mentally. However, the last group often responds quite well.

The blood, infected with the tertian type of **malaria,** (*Plasmodium vivax*) is injected intravenously into the subject to be treated. It is usually transferred from one treated paretic to another, if the blood of a malaria-infected, non-syphilitic patient is not available. The amount used is from 2 to 3 cc., which may be transferred directly, without the use of an anti-coagulant. It is advisable to examine a stained blood smear of the newly infected patient when a new strain of malaria is obtained. On one occasion it was my experience to obtain a strain of quartan malaria (*Plasmodium malariae*), even though this form is rarely seen in this zone.

The paroxysms usually make their appearance in 7 to 14 days after inoculation, being ushered in by a chill, followed by a rise in temperature and a sweat. Therapeutic malaria is usually of double tertian type, paroxysm occurring daily. If the cycles occur too frequently, thus prostrating the patient too severely, quinine, in doses of 1 to 3 grains (64 to 192 mgm.), aids in increasing the interval between paroxysms. Twelve (12) to 14 chills are permitted, depending upon the patient's physical condition. The number of infected red cells should not exceed 10 percent; if it does so, quinine, in small doses is indicated. To terminate the treatment, 10 grains (0.65 Gm.) of quinine sulphate are given three times daily for three days; thereafter, 10 grains daily for 14 to 20 days.

Some of the patients have a natural immunity to malaria and cannot be infected; while others acquire it and terminate the disease spontaneously, after two or four paroxysms.

Some of the complications that have been observed are: Jaundice, which usu-

ally clears up in a week or two; chronically enlarged spleen; general anasarca, usually evanescent and of comparatively short duration; and death due to cerebral hemorrhage, during or immediately after the active fever period.

Sodoku was introduced as a fever-producing disease by Solomon. This disease is also known as **rat-bite fever.** *Leptospira morsus-muris* is generally accepted as the causative organism. This spirochete is propagated by means of a guinea pig or from patient to patient directly. The patients are inoculated subcutaneously, on the inner surface of the thigh. An ulcer develops at this site, which often reaches a magnitude up to 2 inches in diameter and penetrates to the muscles. It has been found that this lesion can be eliminated by injecting the disease-producing organisms deep into the tissues of the buttock. The organism first invades the lymphatic structures, and later the disease becomes a septicemia. Four paroxysms of fever are permitted, each lasting several days. Chills have not been observed. Hirshfield, in 1929, reported on 72 patients with general paralysis treated by this method, in the *Journal of the American Medical Association.* Some of these patients were definitely benefited, but the complications were so severe that other methods of inducing pyrexia seemed more feasible.

The **bacterial protein treatment** has not been applied so extensively as has malaria, in the treatment of unselected paresis. Barely 200 cases have been reported in American journals, while the literature is filled with reports of the latter.

I have submitted a report of 20 patients who have been treated with **typhoid vaccine** and observed, on an average, for 19.7 months following treatment. Over 50 percent of these patients showed improvement—5 of them leaving the hospital and returning to gainful occupations. It is recommended in instances where the patients have not responded well to chemotherapy, or if there has been no material response to malarial treatment.

The preference for using the typhoid vaccine in the production of protein shock is due to the fact that it can be readily obtained, in standardized form, in containers from which the amount desired can be easily withdrawn. The bacteria are suspended in physiologic salt solution, each cc. containing one billion organisms. The initial dose is 50 million bacteria, with subsequent increments of 100 million or more, providing the proper reaction is produced. Inoculations are given intravenously, on alternate days. The cycle following inoculation consists of a chill, coming on about 50 minutes after inoculation, which lasts 10 or 20 minutes. This is followed by a rise in temperature, the fastigium lasting, on an average, for 2 hours. The decline of the temperature proceeds slowly to normal. The average length of a cycle, from the injection until the temperature had reached a normal level, was 9.1 hours. The height of temperature may be regulated by the dose of the vaccine. If the dose becomes too massive; i.e., over 2½ billion bacteria, a rest period of from 10 to 14 days is interpolated, to allow the body to regain its defensive powers. After this, smaller doses will usually give the desired reactions.

Non-specific proteins have been used in the treatment of paresis, but the results have not been so particularly outstanding as to warrant their use. Nuclein and skimmed milk are the ones that have been most frequently used. They are injected intramuscularly. Protein shock follows their introduction into the body, with the usual chill and rise in temperature. Leukocytosis accompanies this form of therapy, rising at times to 35,000 cells per cubic millimeter.

Neymann, at the Cook County Hospital, has treated a series of cases of paresis with **diathermy.** He states that he has been able to increase the body temperature to any level necessary for therapeutic purposes. Some difficulty has been experienced in preventing burns. His findings have not been reported, but he has expressed favorable comments on the results obtained to date from this form of therapy.

Chemotherapy

Chemotherapy is the oldest and the most extensively used method in the treatment of syphilis in its various stages. Arsphenamine and its derivatives and allied products have been used most extensively. These have been administered intravenously, intraspinally and intracisternally, but the favorable results obtained are not comparable to those from tryparsamide. The only application that I have made of

neoarsphenamine was in patients who had cutaneous lesions, such as trophic ulcers, in far-advanced cases, or other skin lesions of a specific nature, and as an alternative or adjuvant to tryparsamide and mercury.

Tryparsamide is the chemical preparation of choice in the treatment of paresis, the only objection being made to its use being the production of amblyopia. This drug contains approximately 25 percent of arsenic and is very soluble and non-irritating to the tissues.

Lorenz and Loevenhart were the first observers to report a series of cases of general paralysis treated with tryparsamide. I began using this agent in 1924 and, in 1927, reported 100 cases which showed improvement, physically, mentally and serologically, in 50 percent of those treated. Since this time I have treated and observed an additional 150 cases, and find that the results obtained correspond closely to those previously reported.

Tryparsamide has been used in all types of neurosyphilis. It does not act favorably in the early cases of syphilis, but gives the best results in early cases of paresis. The only contraindications to this preparation are senility, active pulmonary tuberculosis, acute maniacal states, and advanced, deteriorated and moribund cases of neurosyphilis.

Eye complications appear to be the only objections to its use. I have had only three patients who developed amblyopia, and in these cases it was of only a temporary nature, clearing up without any ill effects upon the vision. While the patients are being treated, it is well to be on the alert for any subjective ocular symptoms and, in addition, to examine the eye grounds frequently. The former conditions appear first when eye changes are being produced by tryparsamide. If any untoward eye symptoms are present, withdrawal of the chemical usually clears them up, without any permanent impairment of sight.

The drug is given in a 2-Gram dose, gradually increased to 3 Grams, dissolved in 10 cc. of water and administered, intravenously, at weekly intervals. Mercury salicylate, 1 grain (64 mgm.), in an oily suspension, is given, intramuscularly, on another day than that of the dose of tryparsamide. This, too, is given weekly. The amount of treatment depends upon the progress of the patient.

The tryparsamide-mercury combination was formerly given in courses of 8 to 10 injections each, but it has been the experience of various observers that a continuous treatment, covering a period of several months, is more effective. I have treated patients in this manner continuously for eight months without a rest period. The remissions which were obtained by this method were more prompt, definite and of a more lasting nature.

Clinically, the patients who responded showed a gain in weight and more bodily activity; while mentally they became more alert, lost their delusions and hallucinations and became normal, depending entirely upon the amount of destruction of the parenchymatous brain tissue. The results obtained with tryparsamide are striking and are often of lasting character. Again, other patients, despite every therapeutic effort, deteriorate to the vegetative stage and ultimatly die.

I have always combined mercury, either in the insoluble or soluble form, with tryparsamide, preferring the former, since I have had very little annoyance from the appearance of toxic symptoms, such as gingivitis, stomatitis, etc. The absorption is slower and is distributed over a period of time. The cumulative effects are often, in my opinion, due to too superficial or cutaneous injection of the mercurial suspension (mercury salicylate in oil.)

Mercury may be used alone, in acute states, if the arsenicals are found to aggravate the symptoms. Mercury administered in the forms of inunctions may be the method of choice; however, in hospital practice, where so many of the patients are demented or excited, it would be difficult to control the amount given.

Recently, Kemp and Stokes have recommended giving tryparsamide during the reaction following the administration of a foreign protein. This may have some merit but, like so much of our syphilotherapy, not sufficient time has elapsed following treatment to draw any conclusions.

Pyrexial treatment and chemotherapy each have their supporters, but it is unwise to choose one, to the exclusion of the other. The type of patient and his response to treatment usually decide which method one should use. The patient who has had fairly complete early antisyphilitic treat-

ment, with the arsenicals and mercury, appears to respond most favorably to tryparsamide and foreign proteins. Patients who have been more or less helpless in hospitals are often decidedly benefited by treatment so that they can be housed in better wards. Some idea can be formed as to the improvement which modern neurosyphilitic therapy has wrought in hospital practice, when it can be stated that only one patient out of eighty-one, diagnosed as general paresis, is now bedridden.

It is desirable to prevent syphilis from reaching the stage of paresis and every effort should be made to treat the patient, in the early stages, intelligently and thoroughly. Two factions of syphilologists are arrayed on opposing sides of the question as to whether or not arsphenamine produces or prevents neurosyphilis.

When the stage of paresis is present, every effort should be made to treat the patient at the earliest possible moment. The amount of treatment given an individual depends upon the response, physically and mentally.

The laboratory findings are used to determine the probable index to the activity and severity of the disease. Very often, advanced cases give a negative Wassermann reaction and a negative precipitation test for syphilis in the blood serum, yet the spinal fluid may show very positive findings. This experience should emphasize the need for an early examination of the spinal fluid, especially if any neurologic symptoms are in evidence.

In treating syphilis, it is well to treat the patient's condition, and not the serologic and spinal fluid findings. The laboratory findings are of paramount importance, as an index to the response of the disease to treatment, but are not always conclusive. To illustrate this point, when a frank case of general paralysis, with many abnormal mental symptoms, outstanding neurological indications and strongly positive laboratory findings for syphilis, was treated extensively, his laboratory findings became negative and remained so for three years. The necropsy findings revealed grossly active, progressive pathologic changes in the brain, meninges, aorta and liver. As a rule, it is felt that the disease is usually quiescent when the laboratory findings are normal. If the laboratory findings are negative and the clinical symptoms do not indicate any retrograde changes, these patients should not, as a rule, be given further treatment, especially pyrexial.

General treatment, such as diet, hydrotherapy, exercise, oral hygiene and operative interference, when indicated, adds very materially to the results obtained.

There is little doubt that the various methods and agents used in the treatment of neurosyphilis are efficacious in a large percentage of patients. The results of the treatment vary greatly in different individuals, which, so far, has not been explained satisfactorily. Likewise, some patients never develop neurosyphilis, even though they are untreated; while others develop paresis with continued treatment—the latter, fortunately, being in the minority.

It is felt that every effort should be made to arrest this disease at whatever stage the patient presents himself for treatment. One should, not only be guided by the laboratory findings, but cognizance should be taken of the physical and mental findings if the latter have been, or are, present.

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Indications for Diastolization

By F. P. M. Clarke, A.B., B.Sc., L.R.C.P. and S., *Liverpool, Eng.*
Hon. Surgeon, Ear, Nose and Throat Dept., Waterloo and District General Hospital

THE history and technic of diastolization were discussed in Clinical Medicine and Surgery for September, 1929, and I shall not attempt here to enumerate all the ailments in which this method of treatment may find a use, but indicate, in a general way, the most important conditions in which it can be employed with satisfactory and gratifying results.

Let me state at once that it is not a panacea for every type of nasal obstruction, or the disabilities arising from these obstructions. Where there are certain anatomic deformities, such as marked deviation of the septum, gross pathologic lesions, such as new growths, diseased, septic sinuses, and cases where the normal tissues have been destroyed by previous cauterizations and operations, diastolization is unsuitable.

These conditions rightfully belong to the domain of surgery. Naturally, it is impossible to expect to correct an osteo-cartilaginous deviation or spur of the septum, or to alter a bony deformity, effect the removal of a new growth, or clear up an infected sinus by soft rubber bougies.

The main condition for the use of diastolization is in cases where there are no anatomic obstructions, but in which there is a localized, diseased condition of the nasal mucous membrane. Diastolization is chiefly concerned with its action on the mucosa, on which structure it has a definite alterative action; and it follows that, in conditions where the mucosa is affected pathologically, diastolization may be considered as an ideal form of treatment.

The indication of choice is in hypertrophic, congestive rhinitis (Friel). In this condition, the patient complains of what is commonly called "nasal catarrh"—a feeling of "stuffiness" in the nostrils; dull frontal headache; malaise; collections of mucus or muco-purulent secretions in the posterior nasopharynx, especially marked in the morning on waking up. The mouth and throat feel "dry"; there is usually an associated chronic pharyngitis. The patient has been swallowing these secretions and it is not uncommon to find a train of gastric symptoms. There may be no infection or disease of the sinuses. The condition is frequently localized in the nasal mucosa. A course of diastolization, here, will give excellent and gratifying results.

In acute and subacute congestion of the nasal passages, in infants and young children, diastolization is the method, *par excellence*. In clearing out and making permeable the nasal airway, it affords a most valuable means in the prevention of adenoid growths in the nasopharynx.

After the "removal" of tonsils and adenoids, to restore and re-educate the normal nasal respiration, a course of diastolization is an excellent practice.

In certain functional ailments, such as headaches, insomnia, "head-noises," digestive disturbances and certain ocular troubles characteristic of nasal insufficiency, this procedure has a valuable therapeutic effect in establishing a free airway, efficient drainage of the nasal cavities and a thorough ventilation of the accessory sinuses and eustachian tubes.

Many instances of "nasal neuroses" appear to derive great benefit and relief from the soothing and tonic effect of the delicate massage of the sensitive nasal mucous membrane.

In asthma, in children, I have found diastolization to give invariably, most excellent results. Children who have had years of various forms of treatment without effect, have benefited enormously by the "desensitizing" action of diastolization. This is exceedingly interesting and opens up a great field for further research on the nature of the action of this procedure in these asthmatic cases.

Following the recent work and conclusions of Haseltine and La Forge, of Chicago, that the "ethymoid area" is the seat of origin or excitation of the peculiar asthmatic reflexes set up by exposure to a toxic agent, it is of great interest to notice the almost immediate and lasting effects of soft-rubber nasal intubation. This effect may be due to the "desensitizing" action which diastolization is well known to exert on the nasal membrane.

When rhinitis is an associated factor, in connection with chronic otorrhea, nasal

dilation is a most valuable adjunct in the rapid and successful treatment of the aural discharge.

Finally, diastolization has an important place in the treatment of patients, in whom operations are contraindicated or who fear operative treatment. It is painless, requires no anesthetic and the patient can pursue his occupation during a course of treatment.

Diastolization has great therapeutic potentialities, and, as the method becomes more widely known, practiced, and investigated, a much wider field will undoubtedly be found for its usefulness.

TABLE

RESULTS IN 200 CASES OF NASAL OBSTRUCTION AND RESPIRATORY INSUFFICIENCY TREATED BY NASAL DIASTOLIZATION.

Causes of Nasal Obstruction and Respiratory Insufficiency, and associated conditions	No. of cases treated	Average No. of treatments	Results and Notes
1.—*Hypertrophic Rhinitis*, accompanied by mouth breathing—no adenoids.			
(a) Children under 15 years....	12	12-16	12 "Cured" of rhinitis. Normal nasal respiration restored.
(b) Adults (Chronic Nasal Catarrh)	26	12-24	19 "Cured": Cessation of excess mucus secretion into pharynx: General improvement in health. 7 Improved: Much less discharge: General health better: Improvement in nasal breathing marked.
2.—*Subacute Rhinitis* accompanied by			
(a) Congestion and mucus secretion (children under 15 years)	15	10-12	12 Complete "cure". Nasal passages clean: Good respiration. 3 Greatly improved: Rhinorrhea practically negligible: Turbinates moderately hypertrophied: (Narrow passages).
(b) Congestion and mucus secretion, with chronic otorrhea (children under 15 years)	48	10-12	44 Rhinitis cleared up. 4 Cases persist in recurrence (diet infection?) The "cure" of the rhinitis and infection has been a great assistance to the "cure" of the chronic otorrhea, which has been treated by zinc ionization.
3.—*Rhinitis*, accompanied by moderate hypertrophy of the adenoid tissue	12	12-16	8 Rhinitis cured: Nasal respiration restored to normal: Adenoid tissue much less at end of six months. 4 Much improvement in nasal respiration but no reduction in adenoids.
4.—*Mouth Breathing* (children under 15). Tonsils and adenoids previously removed—no improvement—M.B. continued—Exercises for M.B. practiced	26	10-15	26 Complete cessation of the mouth breathing, maintained for 12 months afterwards.
5.—*Chronic Catarrhal Otitis*, with deafness, accompanied by hypertrophic rhinitis.			
(a) Adults	10	20-30	4 Rhinitis cleared up: Marked improvement in nasal respiration: Hearing improved: Reduction in the "head noises". 4 Rhinitis cured: No change in the hearing or "noises". 2 Rhinitis improved: No change in the hearing or noises.
(b) Children under 15—no adenoids	27	15-20	18 Rhinitis and mouth breathing "cured": Decided improvement in hearing. 5 Rhinitis "cured": Slight improvement in hearing. 4 Rhinits improved: No change in hearing.

Causes of Nasal Obstruction and Respiratory Insufficiency, and associated conditions	No. of cases treated	Average No. of treatments	Results and Notes
6.—*Chronic, intractable Blepharitis* (treated), accompanied by nasal obstruction and rhinitis—children under 15.....	8	10-15	6 Complete "cure": No local treatment given. 2 Improved.
7.—*Corneal Ulcer*, chronic (treated)	2	12	1 Healed rapidly. 1 Greatly improved: (Local treatment given).
8.—*Recurring Conjunctivitis*, with rhinitis and mouth breathing	6	12	6 Conjunctivitis healed: No recurrence in six months.
9.—*Other Conditions* (Asthma; Neuroses; Stammering; Headaches; etc.).....	8	12-20	5 Decided improvement on reestablishment of nasal respiration. 3 No change, though nasal respiration greatly improved.

In the accompanying table an attempt has been made to put into separate groups those of the 200 cases, treated by diastolization, presenting similar characteristic signs and symptoms of nasal obstructions and nasal respiratory insufficiency. Naturally in many of the cases, certain conditions overlap and it is difficult to make a clear-cut classification of the different lesions causing nasal obstruction. Also, there have been some cases treated for general symptoms, such as headaches, neuroses, digestive troubles, ocular conditions, asthma, etc., in whose origin the nose has been the subject of suspicion on account of an associated nasal insufficiency.

From a study of the conditions treated and the nature of the results obtained in a large number of cases, after various other forms of treatment had been tried with little or no success, I am definitely convinced of the great efficacy of this therapeutic measure, in suitable cases of nasal obstructions and their complications.

We have regularly employed nasal dilatation, during the last two years, in connection with a large ear clinic, where several hundred cases a year have been treated for chronic suppurative otitis media by the Friel method of zinc ionization, and have found that one of the commonest complications associated with chronic otorrhea in childhood, is rhinitis of one form or other and deficient ventilation in the nasal cavities. In these cases, diastolization has been of the greatest value in assisting to clear up the chronic otorrhea quickly. It provides, after a few treatments, a clear nasal airway, effects better drainage and, eventually, by establishing a healthy nasal respiration and clean nasal passages, very materially assists the rapid cure of the otorrhea, in association with zinc ionization.

Mouth Breathing

In the 26 cases of children under 15, mouth-breathers, who have had their tonsils and adenoids "removed" previously, to correct the mouth breathing, the results of a course of diastolization have been exceedingly interesting. In this series of cases, the tonsils and adenoids had been completely removed for periods varying from three months to over two years. In the majority of the cases certain "breathing exercises" were practiced by the children, after the operation, to reeducate the nasal breathing. But the children continued to breathe by the mouth and to snore at night, with very slight, if any, change in the symptoms previous to the operation.

After a course of diastolization, averaging from 10 to 15 treatments, in practically every case efficient nasal respiration was restored, mouth breathing and snoring at night ceased and the general improvement in the child has been commented on by the parents.

These results are of great importance in teaching us that, in many instances, once nasal obstruction has become definitely established and nasal respiration abolished by the hypertrophy of adenoid tissue, the removal of the adenoids alone will not effect a cure of the mouth breathing, or restore the normal nasal respiration. Mouth breathing exercises, while there is no local treatment of the nasal passages, appear to have little or no effect, and this is what one should expect when we consider the pathologic conditions set up in the nasal airway by the abolition of nasal respiration over a considerable period of time.

The simplest and most efficient method of restoring the nasal respiration and reinvigorating the vital functions of the nose, after the "removal" of obstructing tonsils and adenoids, is a course of diastolization, always checking the results by measuring the respiratory coefficient, before, during and after treatment, by the Pech mask.

Some of the results obtained by this method are worthy of special mention.

Case Reports

Case 1.—A doctor, aged 32, complained of having suffered for over 12 years from "nasal catarrh"; profuse, thick, mucous discharge, dropping down into the pharynx during sleep; used at least six to ten handkerchiefs a day for years. Always felt drowsy; general malaise; frequent headache, especially marked when sitting in a warm room; frequent "colds" and a chronic pharyngitis; periodic attacks of pain in the lumbar and sacro-iliac regions; had an irregular temperature for long periods at a time. He was examined by a consulting physician, who was suspicious of latent tuberculosis.

On examination of his nose, I found a chronic, congestive, hypertrophic rhinitis; great congestion of the whole mucosa; enlargement of the inferior turbinates; thick, yellow, streaky mucous discharge from each nostril. The sinuses appeared quite clear on tran-illumination. There was no accessory sinus disease.

After a course, 20 "seances" of diastolization, the whole trouble completely disappeared. He has a clear, healthy nasal airway; no discharge; scarcely any need to use a handkerchief. The pharyngitis improved rapidly and the recurring attacks of pain in the sacro-iliac region disappeared. There has been no recurrence of any of the symptoms during the last two years.

It may be mentioned that, in this case, various lotions, pomades, sprays and inhalations had been used repeatedly without any improvement.

Case 2.—A married woman (age 47) sought advice for a gradually increasing deafness and "head-noises." On inquiry into her general health it was elicited that she had suffered from "chronic dyspepsia and indigestion" for years, and had had her appendix removed, as a possible cause, but there was no improvement. Gas formation in the stomach was very troublesome. She was on a special diet for a considerable time, but practically no change occurred in the symptoms.

A nose specialist had twice cauterized her turbinates for "nasal catarrh," but she felt worse after this. Her nose was always "stuffy." About 12 months ago she found herself becoming gradually deaf, with "head-noises" increasing. This was the particular complaint for which she sought advice.

She showed, on examination, a definite, chronic, congestive, hypertrophic rhinitis; both inferior turbinates moderately enlarged and very congested; the whole nasal mucosa, greyish and unhealthy in appearance; moderate chronic catarrhal deafness (could hear an ordinary watch at about 10 to 12 inches; says she could hear the sounds but they were "muddled"). Great difficulty was encountered in inflating the tympanums, as her eustachian tubes were almost inpermeable.

She was given a course of diastolization—24 "seances"—12; then a rest of 10 days; then another 12 given. There was rapid improvement in the nasal conditions; says she has never experienced such a relief in breathing through her nose before. Coincidently, the digestive trouble improved; the "head-noises" have practically disappeared and her hearing is better. She is now on ordinary diet, with no symptoms of dyspepsia or indigestion. Her general health is vastly improved.

Case 3.—A girl, age 10; persistent mouth-breather. Corrective exercises for mouth-breathing were regularly practiced for over a year, with no improvement. She suffered from frequent colds. Diagnosed: Enlarged, diseased tonsils and adenoids. These were removed by a specialist and the exercises repeated after the operation; but very little improvement was noted six months later.

She was given a course of 12 "seances" of diastolization. After the sixth, the child began to breathe regularly through the nose; mouth breathing ceased; had only one "slight cold" in six months.

After six months, she has healthy, normal, nasal respiration; no further mouth-breathing. In addition to a marked improvement in her physical condition she is, also, mentally clearer and more alert; her memory is better and the "tired feeling" has disappeared.

Conclusions

Our experience of the use of diastolization in the cases we have treated justifies us in coming to certain conclusions:

1.—There are numerous cases of ill-health, due to nasal obstructions and insufficient nasal respiration, in which the causative nasal factor has been overlooked and the symptoms have not responded to treatment directed at the *location of the complaint.*

2.—In the absence of certain anatomic malformations—deviated septum, greatly enlarged turbinates, etc.—the nasal canal lends itself to a gradual dilatation, without any pain or discomfort.

3.—In cases where normal nasal respiration has been abolished for a considerable time, from obstructions such as adenoids, it may not be restored by the removal of the adenoids. The nasal canal requires dilatation and reeducating to its normal function. Removing the adenoids does not remove the true cause of the obstruction. Here, diastolization is strongly recommended.

4.—The action of diastolization procures an efficient drainage of the nasal cavities and ventilates the sinuses of the face, the lachrymal canal and the eustachian tubes.

It relieves the congestion of the tissues; gets rid of the accumulation of secretions in the passages; reestablishes the lymphatic circulation; and has a most important tonic effect on the nerve-complex action of the nasal mucous membrane. This latter action is of great reflexo-therapeutic importance.

5.—Diastolization, in suitable cases, effects a cure of nasal insufficiency, without the destruction of the tissues which takes place in cauterization and resections.

6.—It is the method, *par excellence*, in the treatment of nasal obstruction in the infant and young child.

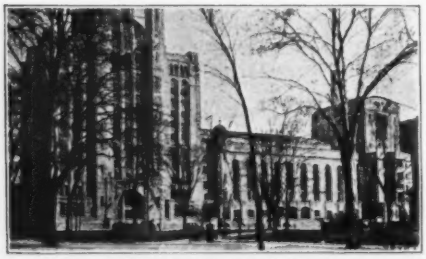
7.—In certain cases, such as hemophilia, old age and advanced debility, where operative treatment is contraindicated, diastolization offers a valuable method of treatment.

8.—The peculiar reflexo-therapeutic effect of the tonic action of massage on the nasal mucous membrane, is one that deserves special investigation.

The International Medical Assembly

Reported by GEORGE B. LAKE, M.D., *Chicago*

THE Assemblies of the Interstate Postgraduate Medical Association grow steadily in size, importance and value. The latest one, held in the Masonic Temple, Detroit, October 21 to 25, 1929, was, I believe, the best attended of any, the registrations being reported as more than 5,000, including a number of guests from foreign countries.



Masonic Temple, Detroit, Michigan, Assembly Meeting Place

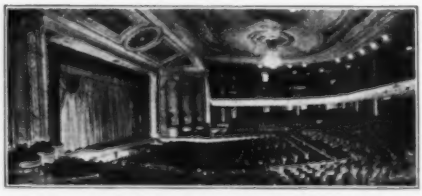
The Masonic Temple was a good place for such a meeting (I understand the A. M. A. is planning to use it, next spring), the auditorium being ideal for the single, large group assemblies. The exhibits were spread about in two large rooms and the corridors, which may or may not have been a disadvantage. There were many interesting things to see.

The only thing to find fault with (except the weather—it rained every day but one) was the fact that the program was scrambled up almost as badly as those of some of the older societies. Speakers were ruthlessly shifted about, so that one could never be sure, by looking at the list, when a certain man would appear. This is rather an important matter, for few care to hear *every* discussion at a tremendous session like this (98 papers and clinics were listed), though there is something to interest every physician, and none are able to really *absorb* scientific information from eight in the morning until ten at night, even with a few brief intermissions.

THE COMMERCIAL EXHIBITS

It is getting so that the commercial exhibits at this meeting are almost as extensive as those at the meetings of the A.M.A. At this session, 110 firms had booths, and all had something to hold the attention of any progressive physician. A number of new things were shown.

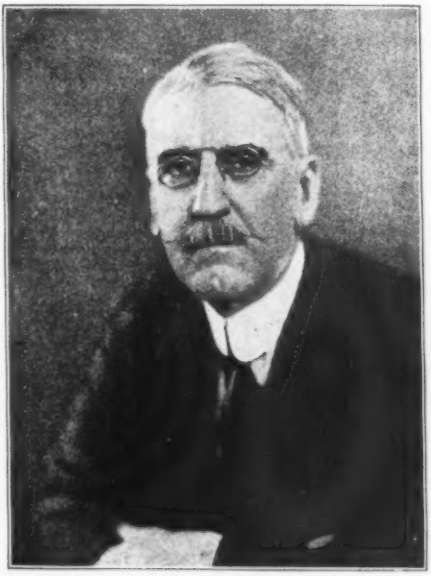
Among the more unusual exhibits, that of Lippincotts, the well known publishers, was decidedly out of the ordinary. Instead of just a rack of books, they had fitted up a double booth as a reproduction of an old English library. Their wares were displayed in two dull-oak bookcases, flanking a beautiful mantel, on which stood pewter lamps. All of the furniture carried out the scheme. Several of their newest offerings will, we hope, be reviewed in these pages ere long.



Masonic Temple Auditorium, Detroit, Mich.

Among the newer equipment was a general-purpose physician's chair-table, made by a leading manufacturer of barbers' chairs and using similar principles of operation. This looked very practical. There was also a new method of applying external dry heat, by means of a neat little bag of some sort of magic sand which, upon the addition of a few tablespoonfuls of water, becomes as hot as one ever needs to have such an appliance. Non-breakable, rustless steel surgical needles were also shown.

Among the new remedies which appeared to be of special value was a solution of the powerful antiseptic, Metaphen, in oil, which is giving highly satisfactory results in the treatment of gonorrhea; vaginal suppositories for applying ovarian hormone in an unusual manner; commercial preparations of the bacteriophages for staphylococci and *B. coli;* and a number of others.



John B. Deaver, M.D., Retiring President

The Scientific Exhibit

The scientific exhibit at this meeting is, so far, much less extensive and varied than those at the A.M.A. meetings; but a number of interesting things were on view.

From the University of Michigan came Drs. F. H. Lashmet and L. H. Newburgh, with a chart showing a simple **test of kidney function**, like this:

I.—*Preliminary Preparations* (3 days).
1.—Patient in bed.
2.—Fluid intake, 1,500 cc. daily.
3.—Diet: Standard nephritic — salt-poor.

II.—Actual Test (on 3rd day).
1.—At 6:00 P.M., stop all intake of food and fluid until the next day.
2.—At 8:00 P.M., the patient voids and the urine is *discarded.*
3.—Then save *all urine,* in separate bottles, as follows:
A.—8:00 P.M. to 6:00 A.M. (4th day).
B.—6:00 A.M. to 8:00 A.M.
C.—8:00 A.M. to 10:00 A.M.
D.—10:00 A.M. to noon.
4.—Put specimens in the ice-box until all reach the same temperature, and then measure the *specific gravity* of each, using a pyknometer if the quantity is small (as it is likely to be).

III.—*Interpretation of the Test.*
1.—Normal kidneys *concentrate the urine to a specific gravity above 1.025.*
2.—Comparison with the phenosulphonephthalein test and the nonprotein nitrogen in the blood, in 86 patients with clinical evidence of damaged kidneys, showed:
A.—Ninety (90) percent *failed* to concentrate the urine above a specific gravity of 1.025
B.—Only 60 percent showed an abnormal phenolsulphonephthalein test.
C.—Only 21 percent showed an abnormal figure for non-protein nitrogen in the blood.

(*Note.*—This test thus appears to be 50 percent more reliable than the "P.S.P." test, and nearly three times as reliable as the "blood N.P.N." test).

Drs. Stevens, Jarre and Halsey, of Grace Hospital, Detroit, demonstrated serial bronchograms, showing peristaltic waves in the bronchi.

These important pictures are another of the significant new developments in clinical photography, and are taken with the "Cinex" camera and shown as a continuous strip, like a moving picture.

Business and Other Matters

At the business sessions of the Assembly (which are of small magnitude, relative to

those of many societies), Dr. William D. Haggard, of Nashville, assumed the presidency, succeeding Dr. John B. Deaver, of Philadelphia, and Dr. Henry Christian, of Boston, was chosen as president-elect. Dr. George V. I. Brown, of Milwaukee, and Dr. William B. Peck, of Freeport, Illinois, are retained as Speaker of the Assembly and Managing Director, respectively.

Minneapolis was chosen as the place for the Assembly next autumn.

As the meeting was in session on the "Golden Jubilee of Light," and as Thomas A. Edison and Henry Ford were in Detroit, both were made honorary members of the Association. One can understand this action in the case of Mr. Edison, but it is difficult to see just why Mr. Ford should be thus honored by a group of physicians.

ABSTRACTS OF CLINICS AND LECTURES

Oral Sepsis in General Diseases

By Sir Frank Colyer, K.B.E., F.R.C.S., London, Eng.

Oral sepsis is much more serious in persons under 50 years old than in those beyond that age.

Nursing mothers with oral sepsis seem able to pass these toxins on to their infants, who then do not gain in weight, but who improve promptly after the mothers' mouths are cleaned up. Every infected tooth should be extracted.

If a patient has pernicious anemia, arthritis, hyperthyroidism, tuberculosis, "neurasthenia" or any other condition which may, presumably, be caused or aggravated by oral sepsis, and it is deemed necessary to remove all of the teeth, this should be *done slowly—a few at a time*—so as not to flood the patient's body with toxins.

We must keep our sense of proportion in dealing with these cases.

Encephalography

By Charles H. Frazier, M.D., Philadelphia Prof. of Surgery, Univ. of Pa., School of Med.

It is now possible to make encephalograms, by injecting air through the spinal canal, without danger of serious symptoms. The spinal fluid should be withdrawn, 5 cc. at a time, *slowly*, and an equal quantity of air injected. The possibilities and advantages of this procedure are not fully appreciated.

If marked intracranial pressure is present, encephalography is *contraindicated*, ventriculography being much safer.

In order to interpret encephalograms, one must be familiar with the appearances in normal persons.

In post-traumatic cases there is frequently an enlargement of the subarachnoid space or in the size of the ventricles, showing a shrinkage of the cerebral cortex.

In cortical atrophy at the *base* of the cerebrum, the air will rise and be seen at the *vertex*.

Encephalography is of more service in *excluding* cerebral tumors than in localizing them.

Diagnostic Clinic (Medical)

By Alan G. Brown, M.D., Toronto, Can. Prof. of Medicine, Univ. of Toronto.

Enlarged Thymus.

"I have never seen a baby who was conscious, 'swallow food the wrong way.'" Many of the children who have a barking cough—"like a puppy"—die suddenly in syncope.

Noisy nasal breathing is not always due to adenoids, and if an operation for this condition is done, in children with enlarged thymus glands, *they die*. If the baby is huddled up, with its head forward, or has it back over the edge of the table, the thymus presses on the vagus nerve, causing death or alarming symptoms.

If a child shows irritability, restlessness and "jumpiness," with other symptoms suggestive of thymus enlargement, percuss the chest carefully and, if the findings are suspicious, make a roentgenogram.

The treatment of enlarged thymus consists of two or three properly adjusted x-ray treatments.

Rickets.

The first patient is a *breast-fed* baby, four months old, who is not growing, is fretful and perspires excessively. The mother, during her pregnancy, ate plenty of fruit and green vegetables, but little meat, butter or other fats.

If a baby is not thriving, either something is wrong with the child or with its food. If the infant is found to be normal,

we may be sure that the food is deficient or improper. We must remember that rickets frequently occurs in breast-fed infants, and that *there is no test of the nutritional value of mother's milk, except the condition of the baby.*

We do not see many advanced cases of rickets, these days. They come to us early, as in this case.

We cannot improve the quality of the mother's milk by giving her viosterol, but we can do so by adding plenty of butter and milk to her diet, and seeing that it is balanced in other ways. Also, we can add viosterol to the baby's diet.

If this does not produce the desired improvement, the child should be taken from the breast, fed with a carefully adjusted milk formula, plus cod-liver oil and viosterol, and exposed to sunshine or ultraviolet rays.

Celiac Disease.

Chronic intestinal indigestion in infants (celiac disease) is more common than many physicians think, because "classical" cases are rather rare.

The baby shown was breast fed for twelve days, since when it has been given *fifteen* different infant foods (demonstrating complete lack of intelligence in handling the feeding problem).

The child is irritable, fretful and anemic; has a large belly, skinny limbs and pronounced *atrophy of the buttocks;* it vomits occasionally and passes large, foul, frothy, greasy stools. This is a fairly typical picture of celiac disease.

We must study the *history* of these cases more carefully and not devote so much time and energy to laboratory work. This condition usually begins between nine months and two years of age, and is due to the newborn bacterial flora. We must not add vegetable carbohydrates to the diet too soon or too rapidly. It is better to stick to proper milk formulas.

In cases like this, the diet should consist of protein-milk, curds and meat, and should be kept to, rigidly, until the stools become constipated, and continued so for *years* (even as long as five or six years). If enough meat is given, the child will grow. After a long time, carbohydrates may be added *carefully* — rice and then oatmeal porridge, etc.

This type of diet creates resistance to infections and is good for *all* babies, but is too expensive for most parents to afford, unless the child is actually ill.

Hypertension and the Kidneys

By Elsworth S. Smith, M.D.,
St. Louis, Mo.
Prof. of Clin. Med., Washington Univ.

It used to be believed that high blood pressure was needed to drive the blood through crippled kidneys, and was, therefore, compensatory and conservative.

This idea is *wrong!* Dr. Clifford Allbutt showed that hyperpiesis often exists in persons with normal kidneys and may, of itself, *cause* kidney disease and arteriosclerosis. The kidneys are not, even as a rule, the cause of high blood pressure; nor is renal disease the commonest cause of death in hypertension, being exceeded by myocardial disease and apoplexy. High blood pressure is *not* "merely a symptom," but a definite disease entity, due to an excess of pressor substances in the blood.

The function of damaged kidneys depends upon the *velocity* of the blood flow through them, rather than upon the blood pressure; and arterial constriction *diminishes* the velocity of flow. The excretion of urea, in such cases, is markedly *increased* by lowering a high blood pressure.

Surgical Diseases of the Spleen

By William D. Haggard, M.D.,
Nashville, Tenn.
Prof. of Clin. Surgery, Vanderbilt Univ.

In the "ague cake" of chronic malaria, which cannot be cured by vigorous antimalarial treatment, splenectomy is indicated. It should *not* be done in leukemia (the mortality is 87 percent) nor in pernicious anemia, which latter is now much better handled by liver diet.

In **splenic anemia (Banti's disease)** the patient is not acutely ill, though the history of indisposition is long; the superficial veins over the chest are prominent; the spleen is enlarged, but *not tender;* moderate, secondary anemia is observed; hemorrhages, from the mucous membranes and stomach occur; general weakness is pronounced.

If untreated, *all of these patients die.* Splenectomy relieves the condition, and the operative mortality is only ten percent.

In **hemolytic jaundice** of the congenital type, the patient is not acutely or obviously ill (in the *acquired* type the illness is acute and severe).

The signs of the disease are: Recurring attacks of jaundice; moderate, secondary anemia; moderate enlargement of the spleen; increased fragility of the erythrocytes; and urobilin in the urine, but *no bile* (acholuric jaundice).

These patients do not recover without an operation; but splenectomy cures them, in many instances.

Purpura hemorrhagica and hemophilia both show abnormal bleeding. In the latter there is *long-continued* bleeding from ordinary wounds; in the former, short and moderate hemorrhages, under the skin (petechiae), following wholly insignificant traumatisms. The laboratory reports a diminution or entire absence of *blood platelets.*

Acute cases of purpura are likely to die under any operation; but chronic cases—thrombocytopenic type — are frequently relieved by splenectomy. This operation will, also, frequently cure **sickle-cell anemia.**

Hydronephrosis

By Hugh Cabot, M.D., Ann Arbor, Mich.
Dean and Prof. of Surgery, Medical School, Univ. of Michigan

The clinical value of pyelograms, in extensive hydronephrosis, is small, because the kidney is usually irreparably damaged and is made worse or completely ruined if more than 30 cc. of fluid is injected for roentgenographic study. This is one way to remove a kidney, but not a highly satisfactory one.

The pain, in these cases, is not a colic, which starts and stops suddenly, like that produced by a stone in the ureter, but begins as a dull ache, which may become almost intolerable, and stops as gradually as it started.

We ought never to have to remove a kidney which has been producing symptoms; we should have diagnosed the condition early and treated it adequately.

Two kidneys may not be absolutely necessary to life; but a "spare" kidney is mighty handy to have on a long journey.

Hyperthyroidism and Gastric Ulcer

By George W. Crile, M.D.,
Cleveland, Ohio
Regius Prof. of Surgery, Western Reserve Univ.

If a vessel be divided by an organic membrane, on the two sides of which are solutions of different saline concentrations and chemical reactions, and these two fluids be connected, a flow of electric energy will take place through the connecting substance.

The nucleus and the cytoplasm of a cell show different concentrations and reactions, so there is a difference in electric potential between them, which can produce a certain amount of energy. If we know two of these factors, we can calculate the third by a logarithm which will hold good for all living cells.

The rate of oxidation in the body is governed by the permeability of the cellular and nuclear membranes. If we can get more nourishment into a cell, its *energy* will be increased. Sodium iodide and thyroxin will increase the permeability of the cell membranes, so that more work will be done.

In hyperthyroidism there is an increase in activity of all the body structures—skin, brain, heart, gonads, digestive system, etc. The senses are very acute and the mental processes rapid. Gastric hyperacidity results from increased secretion ,and diarrhea from hypermotility. These are conditions which favor the development of peptic ulcer; and this condition does not occur in myxedematous patients.

Here is a patient who suffered from hyperthyroidism and developed ulcer. The former condition was treated by a thyroidectomy, after which the man became hypothyroid, and *his gastric ulcer was relieved;* but was made worse by giving him three grains (0.2 Gm.) of thyroid extract a day.

Peptic ulcer occurs at or near the borderline between the acid stomach and the alkaline duodenum, where the difference in potential and the resulting *electrolysis, may* be the cause of the ulcer.

All medical treatment for gastric ulcer is directed toward reducing the acidity of the stomach, and therefore, potentially, reduces the electrolytic processes.

By giving thyroid extract we can increase gastric acidity at will; and it can be reduced by thyroidectomy.

It would seem logical to treat cases of gastric and duodenal ulcer, which have recurred after relief by other measures, by resecting part of the thyroid and the left adrenal gland. Six (6) cases have actually been treated on this basis, with the results which were logically predicted.

Gastric and Duodenal Ulcers

By Dr. E. Starr Judd, Rochester, Minn.
Prof. of Surgery, Mayo Clinic

Gastric and duodenal ulcers are quite separate and distinct lesions. It is harder to diagnose a gastric than a duodenal ulcer, on the history. In gastric ulcer there is a definite, crater-like loss of substance in the mucous membrane. This may occur in duodenal ulcer, but more commonly we encounter duodenitis, which can bleed as freely as a crater ulcer. This latter condition is ten times more frequent than gastric ulcer and is best relieved by *medical* treatment; operation is not justified.

Surgery must be based on definite, anatomic lesions, not on physiologic aberrations. Failures to follow this dictum accounts for the lack of success in Lane's colectomy and fixation of dilatations and ptoses.

No large numbers of gastric ulcers become malignant. In the early stages, the facts can be ascertained only by microscopic examination.

Jejunitis, and sometimes jejunal ulcer, not infrequently follow a gastrojejunostomy. Pain from such an ulcer is on the left side and below the navel. Patients whom we may call "ulcer-formers" should receive medical, rather than surgical treatment; or, if surgery seems imperative, excision of the ulcer area (with, possibly, a gastroduodenostomy) is preferable to gastrojejunostomy.

Maggots in Osteomyelitis

By William S. Baer, M.D., Baltimore, Md.
Clin. Prof. of Orthopedic Surgery,
Johns Hopkins University

After noting that neglected wounds, which had become infested with the maggots of the common "blue-bottle" fly, cleaned up in a surprising manner, it was decided to try this procedure, as a treatment, in a number of cases of chronic osteomyelitis, which had resisted all recognized measures, including from one to five operations, for periods of from one to six years.

The maggots are scavengers, and appear to be able to distinguish between dead and living bone and soft tissues, much more accurately than a surgeon can do, and to eat out all necrotic material *and nothing else.* The body seems to secrete some substance, in its living cells, which protects sound tissues and kills the maggots when they have eaten all dead structures.

Technic

The wound is freely laid open, using no antiseptic precautions (especially no chemicals), and a young family of maggots, previously bathed in 1:1,000 bichloride of mercury solution (to remove pus-forming organisms from their surface), is introduced. The wound is then covered with a cage made of mosquito-wire, with a sponge-rubber edge, held in place by a few strips of adhesive plaster, and is kept freely exposed to the sun and air. If the edges of the wound are dried and painted with collodion, before introducing the maggots, the itching which sometimes results will be reduced to a minimum.

If nerves are exposed in the wound, there will be more or less pain for three or four days; otherwise not. There is some odor from the wound, for a few days only.

Every five days, the wound is thoroughly flushed with saline solution, removing all old maggots, and a fresh family is introduced. Some difficulty is experienced in keeping young maggots on hand in cold weather, but it can be done. The entire treatment lasts from six to eight weeks.*

Results

Healthy granulation tissue grows up in the wounds very rapidly, filling all cavities, and normal epithelium covers the surface, leaving *soft, pliable scars.*

Twenty-one (21) apparently hopeless cases have been treated by this method, and *all were cured.* The functional results are surprisingly good.

Animal Experiments

Three guinea pigs were innoculated with Welch's bacillus and sewed up. All died within 32 hours.

Three other pigs were innoculated in the same manner and, after 12 to 24 hours, the wounds were opened and maggots were introduced. All recovered.

This suggests that, possibly, these larvae may be able to clear up a variety of infections.

***Moving pictures of a number of children, before, during and after this treatment, were shown. The patients appeared to be comfortable and happy during the treatment, and the results were decidedly impressive.—G.B.L.**

The Pathology of Goiter

By Aldred S. Warthin, M.D.,
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Prof. of Pathology, Univ. of Michigan

In every exophthalmic goiter we find hyperplastic lymph nodes and germ centers. We also find an excess of thymus in all cases. This latter fact has, heretofore, been overlooked.

Iodine increases colloid material in the thyroid, and the epithelial hypertrophy disappears; but the hyperplastic lymphoid tissue persists, the lymph centers become exhausted of lymphocytes and lymphoblasts appear. The microscopic picture of a thyroid, after too much iodine, looks like Hodgkin's disease.

"Graves' constitution" is shown by an excess of lymphoid tissue, with hypoplastic adrenals, aorta and heart. The patient who has exophthalmic goiter is *born to it;* it is *not* an acquired disease.

All adenomas of the thyroid are congenital, and many of these tumors are non-toxic. But *toxic* adenoma and hyperthyroidism are identical, from a pathologic standpoint.

The Biokinetics of the Blood

A New Approach to Pathology and Therapeutics

By F. Le Blanc, B.L., M.D., *Elgin, Ill.*

IN THE May, 1929, issue of Clinical Medicine and Surgery, I presented a brief and sketchy introduction to the work and ideas of Dr. J. E. R. McDonagh, of London, England. These theories are so revolutionary in their nature that they are difficult to grasp, but I will try, in this paper, to show, by illustrative cases, the different types of blood pictures revealed in medical as well as surgical conditions, according to McDonagh's suggestions.

Several workers have independently recognized the changes which affect the colloidal particles of the emulsoids of the blood plasma. As an instance, Dorsum, of the University of Pennsylvania, has verified the fact that, in disease, these particles have a tendency to form socalled aggregations at definite pH levels; or again, with a uniform pH level, by altering the electrolyte's concentration. Auguste Lumiere, of France, calls the same state flocculation; and McDonagh uses the term agglutination. Irrespective of such terminology, certain facts are in common. When a condenser (reducing agent), in the form of either a microörganism or a chemical poison, robs the protective substance of the protein electrons, a change occurs in the blood, which can be recognized instantly through its chemistry.

Normal Standards

It may be well at this time to familiarize the reader with the normal findings of the blood serum, as stressed by McDonagh, and although the subject may seem intricate, actual practice proves his contentions and theories to be reasonable.

1.—*Refractometric Index* (Spencer's Abbe-type refractometer).

The normal refraction index of serum, whether of human or of animal (rabbit) origin, is 1.3500. A high reading (above 1.3500) denotes prevalence of the proteid globulin fraction over the albumin; a low reading, an increase of albumin at the expense of the globulin. By Robertson's refractometric method, the relative percentage of albumin and globulin in the serum can be ascertained. (See *J. Biol. Chem.*, XI, 179.)

2.—*Sedimentation Rate.*

For testing the suspension stability of the red blood corpuscles, the Friedlaender tubes are sufficiently accurate. A normal serum, read with the sedimentation line at 18 mm., should require between 1½ and 3 hours.

McDonagh tells us that he has come to the conclusion that the rate at which the red blood corpuscles sink in the citrated plasma, is primarily dependent upon the electronic activity of both the red blood

corpuscles and the protein particles. When both are rich in electrons, the corpuscles sink slowly; and vice versa. A reduction in the suspension stability means a loss of electrons, at the hands of an invader, on the part of the red blood cells and protein particles.

The suspension stability is reduced in practically all diseases, but the reduction is greater in the coccogenic than in the protozoal invasions.

The sedimentation rate is, as a rule, more rapid in women than in men. Women exhibit a faster sedimentation at the menstrual periods, and during pregnancy the maximum rapidity is reached, thereby showing the loss of electrons by the red blood cells and protein particles, produced by the lytic type of condensation.

A guarded prognosis should be given in tuberculous individuals showing a rapid sedimentation rate.

3.—*Viscosity.*

The viscosity of the serum is measured with the Hess viscosimeter, which registers approximately one and a half times the figure obtained for distilled water at 20°C.; i.e., $\frac{1.5}{1}$ or $\frac{3}{2}$.

Broadly speaking, the viscosity of the serum is lowered in the acute stages of a disease and raised in the chronic stages. The rise is due to the relative increase of the globulin over the albumin fraction. Lytic processes lower the viscosity, while hydration or condensation of the protein particles raises it.

To avoid confusion I would suggest as a working standard the following classification:

	Normal (Dispersion)	Dehydration	Hydration
Sedimentation rate*	1½ to 3 hours	Rapid	Slower
Viscosity	$\frac{1.5}{1}$ or $\frac{3}{2}$	Below	Above
Refractometric Index	1.3500	Below	Above
Sugar	90 to 110 mgm.	Above	Below
Urea	20 to 40 mgm.	Above	Below
Albumin-globulin ratio		Albumin+	Globulin+

*Friedlander tube, to 18 mm.

Ultramicroscopic Study

Dispersion (Normal),

Protein particles diminished in size and increased in motility; absence of clumps, giant or agglutinated and precipitated particles.

Dehydration (Lysis)

Only a few particles are seen, and those exhibit the characteristics of condensed particles.

Gelato-Hydration.

Particles show an increase in size and refractility; clump formation and decrease in motility; ring forms of lipoidglobulins; giant particles and precipitation.

Broadly speaking, albumin particles are small and of a dullish-grey hue; as compared with globulin particles, which are large, white and refractile. Globulin particles, if not accurately focused, may exhibit the colors of the spectrum.

McDonagh has found that, "If an electric current is passed through a serum film, the particles become increased in number at the negative pole, and agglutinated and precipitated at the positive pole.

"If the current is sufficiently strong, the particles increase in size and refractility at the negative pole. If an electric current is passed through a syphilitic serum, some of the particles take on a ringed form—one of the characteristic features of lipoid-globulin.

"If an electric current is passed through lipoid-globulin particles, fatty acid crystals are formed at the negative pole. Acids and alkalis send most of the particles into true solution (lysis)."

Case Reports

I will give, as an illustration, the case of a physician who, following influenza, developed repeated empyema abscesses over a period of two months and who, in spite of adequate drainage, did not show sufficient resistance to the causative noxa.

The blood chemistry revealed the following:

Case 1.

Sedimentation Rate: 15 minutes.
Blood Sugar: 110 mgm.
Blood Urea: 60 mgm.
Viscosity: $\frac{2}{1}$ or $\frac{4}{2}$ at 25° C.
Refractometric Index: 1.3524 (Formaldehyde index +10).

Ultramicroscopic: Very few particles moving, consisting mostly of those of the large, giant and clumped varieties; individual large and giant particles were precipitated; many

of the white blood corpuscles had no Brownian movement in their plasm.

This report shows, by the rapid sedimentation, that the protective substance was being robbed of its electrons and, consequently, had not sufficient resistance to the destructive effect of the invader.

McDonagh tells us that, as the infection progresses, some of the protein particles split up, preparatory to going into true solution, while others increase in size and agglutinate. (Such changes as mentioned above have been called aggregation, flocculation or agglutination.)

The object of treatment is to increase the electronic activity of the protein particles in the plasma; and such treatment is successful when it increases the number, Brownian movement and negative charge of these protein particles.

Consequently, in this case, a conductor was prescribed, in the form of the symmetrical urea compounds "Sup. 36" and "Sup. 468," given intramuscularly as follows: "Sup. 36" on two successive days, in doses of 10 mgm., followed by three doses (2 mgm. each) of "Sup. 468," also on three consecutive days, with the result that the temperature was abated and a rather evasive empyema pocket was located and drained, with perfect recovery, as evidenced by the following blood examination just previous to his leaving the hospital:

Sedimetation Rate: 1 hour.

Blood Sugar: 100 mgm.

Viscosity: $\frac{1.6}{1} - \frac{3.2}{2}$ at 20° C.

Refractometric Index: 1.3500 (Formaldehyde Index +7).

Ultramicroscopic: Myriads of normally-dispersed particles, with intense Brownian movement, were seen; also a few giants and clumped particles; very few giant particles were precipitated.

This blood could well handle the situation and prevent further pockets from forming, as evidenced by the normal sedimentation rate, sugar, viscosity and refractometric index, as well as by the almost normal ultramicroscopic picture of the serum.

Clinically, the patient's temperature, pulse, sleep, appetite, etc., had improved immensely following the injections of the symmetrical urea compounds; all of which occurred previous to the final evacuation of the last empyema pocket, which had no further recurrence.

Case 2.

This next patient, I am convinced, owes her life to McDonagh, for, although a consultant admitted that she "had not one chance in a million," she was sufficiently recovered, in two weeks, to leave the hospital.

This was a case of streptococcic endocarditis, in spite of the disputed verification of the blood culture. The patient showed a temperature of the hectic type and reaching over 105°F., each day for several days; petechiae developed over the body; nephritis and otitis media (without pus) complicated the picture; and at one time the patient was semi-comatose.

The first blood chemistry study was as follows:

Sedimentation Rate: 35 minutes.

Blood Sugar: 165 mgm.

Viscosity: $\frac{1.7}{1} - \frac{3.4}{2}$ at 22° C.

Refractometric Index: 1.3485.

Ultramicroscopic: No moving particles visible; a few agglutinated and precipitated particles noted. This shows a definite dehydration and the effects of a severe ionizing agent.

Following the administration of the symmetrical urea compounds, given intramuscularly as in Case 1, consisting of two doses of "Sup. 36" (10 mgm.), followed, on six consecutive days, by "Sup. 468" (2 mgm.), the blood showed, *four days after the last injection*:

Sedimentation: 45 minutes.

Blood Sugar: 135 mgm.

Viscosity: $\frac{1.7}{1} - \frac{3.4}{2}$ at 20° C.

Refractometric Index: 1.3485.

Ultramicroscopic: Quite a number of moving particles, among which several agglutinated clumps and giant particles were noted; a few precipitated agglutinations present; very marked Brownian movements noted in the plasma of the white cells. This shows improvement, but still the effects of the active dehydrator are present.

I shall not go into much detail as to treatment, on account of space, but suffice it to say that resort to three doses of anti-streptococcus serum, subcutaneously, one of 20 cc. and two more doses of 10 cc. each, on alternating days, with caprokol, one capsule (0.15 Gm.) four times a day concomitantly, as well as one renal pelvic lavage with 10-percent argyrol solution,

finally conquered the probable source of infection.

Following two more weeks the final blood picture was as follows:

Sedimentation Rate: 20 minutes.

Blood Sugar: 110 mgm.

Viscosity: $\frac{1.8}{1} - \frac{3.6}{2}$ at 22° C.

Refractometric Index: 1.3505.

Ultramicroscopic: Very many moving particles, most of which were normally dispersed; many spheroid clumps, consisting of agglutinated small particles; and a few giant particles. A few individually precipitated giant particles were noted.

The patient left the hospital and has been in splendid condition during the four months since then.

McDonagh remarks that streptococcal infections do not respond so dramatically to treatment as do less serious ones; which fact was keenly experienced in this case and is easily verified by analyzing each blood picture, especially noting the sedimentation rate which, in spite of recovery, shows the serious nature of the infection.

Case 3.

This case is that of an elderly lady with a fractured hip and threatened with pneumonia, as evidenced by fever and chest symptoms.

The blood revealed the following:

Sedimentation Rate: 37 minutes.

Blood Sugar: 150 mgm.

Viscosity: $\frac{1.7}{1} - \frac{3.4}{2}$ at 25° C.

Refractometric Index: 1.3484.

Ultramicroscopic: Many moving particles of the ringed and small clump varieties; several giant and clumped particles precipitated. Such a picture reveals an active dehydration and calls for conductors.

The treatment consisted of one injection of the symmetrical urea compound, "Sup. 36" (10 mgm.) and two of "Sup. 468" (2 mgm.), and was followed by perfect recovery.

The patient was fitted with an ambulatory splint and discharged from the hospital in excellent condition.

I am sorry that I did not have the opportunity for a final blood examination in this patient.

Case 4.

This was a case of pneumonia, referred to me a few hours before death.

The sedimentation rate was not taken, but must have been extremely rapid.

Blood Sugar: 190 mgm.

Viscosity: $\frac{1.6}{1} - \frac{3.2}{2}$ at 22° C.

Refractometric Index: 1.3468.

Ultramicroscopic: Myriads of gelated particles. In this case, treatment was of no avail. Especially striking in this case was the low refractometric index and the ultramicroscopic picture.

Case 5.

This was the case of a young man in a comatose condition, showing muscular jactitation, following a post-influenzal encephalitis.

Sedimentation Rate: 18 minutes.

Blood Sugar: 115 mgm.

Viscosity: $\frac{1.9}{1} - \frac{3.8}{2}$.

Refractometric Index: 1.3501.

Ultramicroscopic: Several moving particles, consisting mostly of giants and clumps, as well as agglutinated ones, many of which showed precipitation.

The treatment given in this case consisted of Leukotropen,* in 10 cc. doses, intravenously, for two doses on two consecutive days, and Contramine, 0.125 Gm., intramuscularly, at 5-day intervals for three doses.

On the day following the Contramine, 500 cc. of 10-percent dextrose solution was given intravenously, followed by one 2-mgm. dose of "Sup. 468," intramuscularly, a few hours after the glucose injection.

The patient became conscious within 12 hours and made a slow but uneventful recovery. The symptoms caused by the precipitation of the hydrated particles in the brain were corrected by breaking up such particles and restoring them to the circulation.

Case 6.

This was a case of acute cholangitis, in a young woman who, taken to the hospital for operation, persisted in vomiting for two weeks, and operation was postponed on that account. She was in a moribund condition when seen, and had been unable to retain any liquid, given by mouth, for one week.

The blood serum was examined, with the following findings:

Sedimentation Rate: 1 hour and 45 minutes.

Blood Sugar: 90 mgm.

Viscosity: $\frac{2.2}{1} - \frac{4.4}{2}$ at 26° C.

*A combination of cinchophen and methenamine. —Ed.

Refractometric Index: 1.3544.

Ultramicroscopic: Practically no particles to be seen, moving or precipitated, with the exception of a few ringed and giant-particled clumps.

An intravenous injection of 500 cc. of dextrose, followed in a few hours by *one* 10-mgm. dose of "Sup. 36", intramuscularly, enabled the patient to retain, by mouth, 72 ounces of fluid the following day, after which she proceeded with a gradual and perfect recovery, leaving the hospital in ten days. All symptoms referable to the gall tract abated and, as yet, no operation has been performed, as no further attacks have occurred in over one year and three months.. The extremely high refractometric index shows the severe hydration in this case.

Case 7.

This patient was another who, although given up to die, made a splendid recovery —a young woman with septic endometritis and local peritonitis, following puerperal septicemia.

I want to caution here that it is a dangerous practice to treat such cases with symptomatic evidence, as had been done, with the very best of intentions. This case was given treatment which produced a further dehydration of an already dehydrated blood, consisting of isotonic saline solution, dextrose and digifolin—all perfect dehydrators—and the patient was rapidly becoming worse.

The first blood picture was as follows:
Sedimentation Rate: 20 minutes.
Blood Sugar: 140 mgm.
Blood Urea: 50 mgm.
Viscosity: $\frac{1.69}{1}$ - $\frac{3.3}{2}$ at 26° C.
Refractometric Index: 1.3468 (Urine, 1.3352).

Ultramicroscopic: Very few moving or precipitated particles, consisting of amicronic, some large and a few giant particles, and a few agglutinations with practically no Brownian movement.

Although the patient was semi-comatose on that evening, one 10-mgm. injection of "Sup. 36," intramuscularly, enabled her to relish food the following day, when another similar dose of "Sup. 36" was given. After that, one 2-mgm. dose of "Sup. 468" was given, intramuscularly, on three alternate days, when the temperature and symptoms cleared gradually and the patient was discharged from the hospital on the tenth day following.

Two months afterwards the blood was again examined and showed as follows:
Sedimentation: 1 hour and 40 minutes.
Blood Sugar: 130 mgm.
Blood Urea: 40 mgm.
Viscosity: $\frac{1.6}{1}$ - $\frac{3.2}{2}$ at 21° C.
Refractometric Index: 1.3479.

Ultramicroscopic: Very many normally dispersed particles, including occasional small clumps and giant particles. Very few of these were precipitated.

I am sure that anyone can appreciate that, although this patient recovered, the blood still showed evidence of a remnant of infection, as revealed by the high blood sugar and urea and the low refractometric index, as well as by the ultramicroscopic findings.

This young woman travels, and the last I heard she was taken to a local hospital for an attack of gall-stones, but was discharged the following day and is engaged in strenuous acrobatic work, in which she performs daily.

Case 8.

This final case is not reported with the intention of proving that systemic diathermy treatments are the equivalent of malaria treatment in paresis: It is, however, interesting to note that the hydration state of this paretic *did* respond to diathermy, similarly to the response incident to the dehydrating influence of malaria treatment.

This was a test case, on a patient from the Elgin State Hospital, and was done at the suggestion of Mr. Darnell, of the Victor X-Ray Corporation, and with the assistance of Dr. Koenig, of the local institution.

Before diathermy:
Sedimentation: not taken.
Blood Sugar: 60 mgm.
Blood Urea: 90 mgm.
Viscosity: $\frac{1.8}{1}$ - $\frac{3.6}{2}$ at 23° C.
Refractometric Index: 1.3512.

Ultramicroscopic: Very few moving particles, consisting of giants, clumps and agglutinations. Many separate giant particles, several clumps and agglutinations were precipitated.

This blood showed the typical gelatohydration found in paretics. Following the diathermy treatment, whereby a temperature of 104°F. was artificially produced for several hours, another blood test was taken

three days afterward, with the following results:

Sedimentation: not taken.
Blood Sugar: 80 mgm.
Blood Urea: 70 mgm.
Viscosity: $\frac{1.8}{1}$ - $\frac{3.6}{2}$ at 20° C.
Refractometric Index: 1.3502.
Ultramicroscopic: Many moving particles, including several agglutinations, a few clumps and exceptional giant particles. Very few precipitated particles were seen.

I report this case with a very conservative realization that one case is insufficient to prove the value of this type of treatment. However, in a personal communication, McDonagh says he feels that such a procedure is worth investigating and that the results are those which he would anticipate.

Here was not a series of rigors, such as are created by the malarial treatment but, so to speak, the result of one rigor artificially produced, with the effect of lowering the refractometric index, increasing the blood sugar and lowering the blood urea, all of which show, in this test, some corresponding dehydration of the previously hydrated state. This experiment has not been followed up clinically or otherwise, for lack of opportunity.

This interesting work of McDonagh needs individual perusal, verification and constructive criticism; and anyone interested in furthering this study will be welcomed by communicating with me at 3104 Pittsfield Bldg., 33 N. Wabash Ave., Chicago, Ill.

Modern Views on Some Diseases of the Blood and Heart

(A Review of Recent Writings)

By Dietrich Klemptner, M.D., *Chicago*

Pernicious Anemia

THE outstanding achievement of recent years in Medicine is, perhaps, the liver treatment of pernicious anemia. Yates and Thalhimer reported, in December, 1926, a case in a man of 65 who, in the course of the last two years of his life, had a splenectomy done and was given 113 blood transfusions. Though the mortality has not been totally abolished, our present treatment is more positive and a great deal simpler. Splenectomy, in the treatment of pernicious anemia, is definitely a thing of the past. Blood transfusions are indicated only if the patient is first seen in a high state of anemia—around 20 percent of hemoglobin—to tide him over a critical stage until the liver treatment becomes effective; or when the patient has had a relapse through neglect in treatment.

Cases have now been observed, here and in Europe, for over three years, and certain conclusions have been reached. The amount of liver or liver extract necessary to keep the symptoms of pernicious anemia in abeyance varies from 500 to 1,000 grams of liver or the equivalent, and has to be determined by clinical observation. The patient who keeps to his diet is safe from relapses. But the opposite does not hold good: Some patients may, after being temporarily benefited by the liver treatment, take insufficient amounts or no liver without developing a relapse for many months. But, if they do suffer a relapse, they are more refractory to treatment.

The latent stage—that is, the period before the liver effect becomes apparent—according to Hans Schulten, in the *Muenchener Medizinische Wochenschrift*, extends from 5 days to 4 weeks; and he makes an interesting observation: In the course of the treatment, patients, while showing a decided clinical improvement, may show a drop in hemoglobin of 10 percent. Schulten declares that this is only a *relative drop*. The volume of blood, diminished in anemia, becomes larger and brings about a lowered hemoglobin percentage, though the *absolute* amount of hemoglobin is on the increase.

The nature of pernicious anemia has not been cleared up. The gastric changes seem to be primary. There is some agent, present in normal digestion and absent in

anemia patients, that protects the hematopoietic organs and the nervous tissues from the changes characteristic of the disease. Tests have shown that the eating of beef, previously digested by a normal stomach, and of dried stomach gives the same results as liver feeding.

Following extensive resection of the stomach, many authors have reported clinical syndromes that present a picture of a classical primary anemia or of extensive secondary anemia; and it is interesting to note that all of these conditions respond to liver feeding. Max Hochrein is inclined to disregard the hematologic findings in these syndromes and to consider them all primary anemias.

Agranulocytosis

Agranulocytic angina continues to hold medical attention. W. Schultz first described this syndrome. It is characterized by ulcerations of the tonsils, of the mucous membranes of the throat, pharynx and elsewhere in the body; by leukopenia, with nearly complete absence of granulocytes; and by a stormy and generally fatal course. Similar clinical pictures are encountered in severe septicemias, in acute leukopenic leukemias and in some other conditions, and many authors see, in agranulocytic angina, merely a type of reaction to a severe infection or toxemia.

W. Schultz insists that agrunulocytic angina is a definite disease entity, and points out that a normal platelet count and an absence of hemorrhagic tendency are distinct differential signs, characteristic for this type of angina and not found in similar syndromes.

Of interest in this connection is a case described by Benatt in the *Muenchener medizinische Wochenschrift*. An 18-year-old boy was taken suddenly sick, with high fever, delirium, shortness of breath, diarrhea and prostration. Broncho-pneumonia patches developed within a few hours, the throat remaining clear. In 24 hours the boy was dead. The *blood count* showed 2,500 leukocytes, with only 12 percent granulocytes. A second smear, a few hours later, showed 9 percent granulocytes, with marked degenerative changes. The author justly surmises that, had it not been for the short duration of the illness, the granulocytes would have disappeared. The blood platelets were normal in number and there was no hemorrhagic tendency. This case of influenza had all the signs of agranulocytosis except the angina.

Angina Pectoris

A good deal of instructive information is to be found in current literature regarding angina pectoris, which is not a pathologic entity. A person who has died from an attack may not disclose any lesions whatever, at the autopsy; and, on the other hand, a patient may show any amount of cardiac disease, and yet need not have exhibited any anginoid signs in life.

It is generally admitted that disease of the coronary arteries, the myocardium and the aorta is back of the syndrome. Some patients who have gone through a coronary thrombosis and recovered, lose their attacks of angina. This fact is considered proof that the closed artery was the offender responsible for the attacks.

The diagnosis of angina pectoris is fraught with responsibility. Schlayer, out of his extensive experience, records a number of syndromes that may simulate angina. Some young women around 20, while under the stress of emotions, in crowds or poorly ventilated rooms, suffer attacks of stenocardia: Precordial distress is present; the pulse is small and frequent; the extremities are cold; the eyes sink in and the nose becomes sharpened. The prognosis is absolutely good in these subjects.

Women in the menopause are subject to night attacks of choking sensation, precordial pain, cold feet and, in place of the *angor animi*, there is a sinking sensation that is characteristic for the vasomotor disturbances of the menopause. Corpus luteum is an efficient treatment for the relief of these attacks.

Of special interest is the case of two experienced physicians, one 50 and the other 60 years of age, who considered themselves sufferers from angina. They felt pain and pressure beneath and to the left of the sternum, the pain radiating to the left around the chest; the pain was aggravated if they were exposed to a cold wind; there were tender spots on the chest; one had a positive Wassermann test; the temperature was slightly elevated and mild leukocytosis was present. The attacks did not yield to nitroglycerin, but responded promptly to aspirin. The diagnosis was intercostal neuritis.

Contracted gall-bladder and latent renal calculus belong in the same group; also tabetic crises.

Roemheld described a gastro-cardiac syndrome that also comes under this head. A certain constitutional predisposition—a *cor mobile*, associated with gaseous distention of the stomach or intestines—brings on the attack. The heart is pushed upwards and rotated and the cardia and large arteries become compressed or angulated. The fluoroscopic picture is that of a chest following a phrenicoexeresis, with the aorta standing out as in arteriosclerosis. The pain varies from mild distress to severest stenocardia, followed by loss of consciousness. The pulse is small and there may be vomiting and diarrhea. Vomiting or belching of gas is followed by prompt relief. Heart remedies do no good. Lying on the left side, permitting gas to escape, also gives relief.

This syndrome occurs at all ages. When it is associated with disease of the myocardium or aorta, the differential diagnosis is difficult and the gastric as well as the cardiac factors have to be considered. Proper dietetic and hygienic measures bring about a cure. Romberg states that over 10 percent of his private patients showed this syndrome.

Schlayer claims that 90 percent of all cases of angina pectoris under 40 years are of syphilitic nature and insists on specific treatment, even in the absence of a positive Wassermann test. He cites 3 cases that had been Wassermann-negative and disclosed mild syphilitic changes in the aorta at the postmortem; they might have been saved by specific treatment. He insists that the arsenicals must be used in this group of cases in order to get results, contradicting many American authors, like Harlow Brooks.

If these cases are recognized early, the prognosis is fair. Generally, syphilitic heart disease carries a poor prognosis. It is also admitted that the prognosis in cases with high blood pressure and in those that are brought about by exertion is better than in those with low blood pressure and those that develop during rest. Exceptions to this rule are rather common.

In the treatment of angina, Gilbert and Kerr used purine-base diuretics, with satisfactory results. These drugs produce an increased coronary flow. They used theobromine, 5 grains (325 mgm.); theobromine-calcium salicylate, 7½ to 10 grains (0.5 to 0.65 Gm.); theophylline, 2 grains (130 mgm.); theophylline-ethylenediamine (Euphyllin), from 1½ to 3 grains (100 to 200 mgm.). Four doses a day were usually given.

If given persistentiy, these drugs cause unpleasant by-effects, like nausea, vomiting, cramps and dizziness, and they are therefore given for four days and omitted for the rest of the week. It is also useful to shift the drugs, in order to avoid developing a toleration. The patient's tolerance of the drug has to be studied: He may not tolerate one drug, and yet be distinctly benefited by another that is chemically similar.

In the severest obstinate cases, various surgical measures may be resorted to. F. Mandl used paravertebral injection of the five left, upper-dorsal intercostals, with a procaine solution. Swetlow used 85-percent alcohol for the same purpose, and claims no bad results and marked remission of the painful attacks in his cases. Paul D. White reports five cases in which he used alcohol injections and confirms the conclusions of Swetlow. But he noticed an unpleasant, persistent hyperesthesia in the area supplied by the infiltrated nerves. As the point of the needle comes into close proximity of the pleura and the cord, an accurate operative technic is essential. This method is being given a trial in our hospitals and promises to become popular for a restricted group of cases.

Arrhythmias

Thomas Lewis has furthered the study of cardiac irregularities, among the English-speaking physicians, by his classical little book on the subject, though many irregularities do not yield, as yet, to any classification.

S. Levine has recently attracted attention by his work on **paroxysmal ventricular tachycardia.** Significance is given to this condition, because Levine tells us how to diagnose it without the aid of an electrocardiogram. He gives three signs: The heart rate is frequent—150 to 200 beats a minute—and regular, though *slight* irregularities may sometimes be detected; the first heart sound varies in intensity in different cycles; irritation of the vagus does not slow down the tachycardia.

Ventricular tachycardia is found in myocardial exhaustion; commonly in coronary thrombosis; and may be the effect of

certain drugs, such as digitalis and quinidine. The only drug that will check the tachycardia is **quinidine,** though it does not work in all cases. Its effect is due to the slowing of conduction and the prolongation of the refractory phase of the myocardium. The efficient dosage varies and has to be determined for each case. Levine and Fulton have used from 0.2 Gram, four times a day, to 1.5 Grams, five times a day.

A myocardium that is the seat of coronary thrombosis will stand but poorly the additional strain of a rapid heart action. The patient may be tided over the critical stage, if a normal rhythm is restored. A dramatic instance of this kind is recorded by Levine and Fulton. A man with the classical signs of coronary thrombosis and ventricular tachycardia, and with a heart rate of 204, was given quinidine sulphate, by mouth, five times a day; his rhythm was restored to normal and he showed a decided clinical improvement. He went through a long convalescence and eventually became ambulant. In a similar case, where this large dose had not been used and the normal rhythm was not restored, the patient died. The heroic dose used in the successful case was justified by the result and the desperate nature of the condition. Further observations will prove of great interest.

The quinidine treatment of **auricular fibrillation** has been established on a firmer foundation. Digitalis is a marvelous drug in restoring compensation, slowing the pulse and doing away with the pulse deficit; but, except in unusual circumstances, it will not bring back the normal rhythm. Quinidine will do it in many cases.

The fatal accidents reported, from all over the world, following the use of quinidine, have restricted its use, except in the large clinics. The proper understanding of the indications and contraindications for the use of quinidine, and a careful technic, have abolished most of these accidents, that were due to embolism, to ventricular fibrillation and to respiratory paralysis.

Spiro and Newman report a series of 41 cases with no fatality due to the use of quinidine and with 80 percent success in restoring, for a shorter or longer time, a normal rhythm. Their technic is fairly complicated and demands hospitalization of the patient, who must first be digitalized; compensation must be established; the pulse must be down to 84 or lower; and there must be no pulse deficit. A fluoroscopic study of the heart action is demanded. If the heart contracts and relaxes vigorously, it is not likely to harbor clots that may be mobilized by quinidine; a flabby action should contraindicate its use. The drug is given in gradually ascending doses, as the efficient dosage has to be determined for each case, the patient watched for his tolerance of the drug. The signs of danger are:

1.—Showers of petechiae on the mucous membranes or anywhere on the body.

2.—Air hunger, dizziness, anxious expression and cold sweat mean that the quinidine should be discontinued and *caffeine* given, as the latter drug is an absolulte antidote.

3.—An increase in pulse rate, running to 125 or higher, demands that the quinidine should be stopped, as there is danger of producing ventricular fibrillation. The presence of specially-trained nurses is required to be safe from overlooking this danger sign.

4.—Vomiting, diarrhea or albuminuria demands discontinuance of the drug.

As soon as the normal rhythm is restored, the dose of quinidine is reduced to not more than 12 grains (0.8 Gm.) a day.

The total doses used by Spiro and Newman, in their series of successful cases, were from 36 grains (2.4 Gm.) in two days to 186 grains (12.4 Gm.) in eight days. The rhythm stayed regular, from 1 day only to 1 year and 7 months.

Cardiac Edema

One drug more should be mentioned here for its great value in the treatment of edema from congestive heart failure or, it seems, from any other cause, and that is **Salyrgan,** a mercurial compound, the successor to Novasurol (merbaphen). It is less toxic than the latter and has not been known to produce stomatitis or proctitis. It is given intravenously or intramuscularly and produces a marked diuresis, beginning from one to four hours after administration and ending from eight to twelve hours later. The body should be previously saturated with ammonium chloride, giving 8 Grams daily for three days. The drug proves a failure only in the moribund and when compensation is completely broken down.

Barker and O'Hare have used Salyrgan in a variety of conditions; as in cardio-

renal edema, nephrosis, malignant conditions with ascites, cirrhosis of the liver, tuberculous peritonitis, pleurisy with effusion and malignant conditions with chylous pleural effusion. The urinary output was increased from 25 to 500 percent.

Desperate cases may respond to Salyrgan. A woman, aged 69, under my care, was suffering from diabetes, precordial distress, dyspnea, orthopnea, oliguria and insomnia. She was fibrillating, with a heart rate of 108 and blood-pressure of 260 over 150; there was generalized edema; her urine was loaded with albumin and casts; the amount of urinary sugar was small. The blood sugar was 240; non-protein nitrogen, 70; no acidosis. She had been under insulin treatment and digitalis.

She was given ammonium chloride, 6 Grams daily for two days, and then Salyrgan intravenously. There was marked diuresis; the edema and precordial distress were first to improve. The Salyrgan was kept up in doses of 1½ ampules three times a week. Her dyspnea disappeared and she could lie down comfortably, flat on her back, though she was allowed to sit up, as cardiorenal patients generally feel better when allowed to do so. She is not yet ambulant, but her general improvement is pronounced.

The life of such patients can be made comfortable and prolonged by the use of Salyrgan, if they cooperate and live on a low level of activity.

2705 W. North Ave.

Progress in Radiology

(The Radiological Society of North America)

By D. L. TABERN, Ph.D., *Lake Bluff, Ill.*

THE annual meeting of the Radiological Society of North America took place in Toronto, Canada, Dec. 2 to 6, 1929. Bringing together, as it did, radiologists from the entire continent, the meeting may well serve, in its scientific papers and its exhibits, as an excellent background for observing the rapid progress made by this division of medicine during the past year.

The announcement by the president of the society, Dr. M. J. Hubeny, that the journal, *Radiology*, is to receive financial support from the Chemical Foundation, bids fair to be of outstanding importance. It is the aim of its sponsors and editors to make this journal the world's foremost publication in its field, and to have it serve, more quickly and completely than ever before, as the medium for the publication of worth-while original papers and abstracts.

No doubt this new alliance between chemistry and roentgenology will serve to stress the interdependence of the two sciences, and to focus attention upon mutual problems. In the last analysis, the effects of x-ray and ultraviolet radiation upon the body are primarily chemical in nature. The roentgenologist daily makes use of the socalled "contrast media"—radiopaque substances designed by the chemist for the better visualization of certain body areas. On the other hand, the chemist, the physicist and the biologist are finding the study of the effects of these radiations upon various types of pure chemical substances an increasingly attractive field. Their efforts have led to such divergent ends as new theories of atomic structure, new views regarding the mechanism of chemical reactions and, to select but a single instance of immediate practical importance, to the synthesis of vitamin D.

The Toronto meeting may be divided into three phases, the scientific papers, the scientific exhibit of roentgenographs, and the commercial exhibits.

DEVELOPMENTS IN ROENTGENOGRAPHY

The most striking progress seems to have been made by Pancoast and Fay in the field of **encephalography**. Through the withdrawal of cerebral fluid and the lumbar insufflation of air, at constant pressure and under rigorously standardized technic, the dangers of the procedure seem to have been largely eliminated. Among their 900 cases, but one death occurred. The paper dealt with studies of the normal pathways of the cerebrospinal fluid and the obstructions

and deformities demonstrated by the roentgenogram in pathologic conditions. An excellent exhibit of encephalograms by these workers proved of great interest.

The importance of x-ray functional studies was stressed by Dr. H. A. Jarre, of Detroit. By means of his invention, the "Cin-ex Camera," which permits the taking of roentgenograms upon a moving film band at the rate of three per second, Jarre is able to study motor phenomena in the bronchial tree, the gastrointestinal system, the urinary tract, etc. In the normal individual, a characteristic peristalsis is observed in each case, which becomes impaired in disease. An organ which appears normal upon single films may show complete abnormality of function when studied by the Jarre method. Conversely, he has demonstrated that a normal organ may present fleeting phases which, if caught by a single roentgenogram, could only be called pathologic. The moving picture has greatly altered our outlook upon life and these new "X-ray movies" may well exert a profound influence upon future progress in roentgenology and medicine.

The Royal York Hotel, Toronto, where the Meeting was Held.
(The entire floor where the arched windows appear is used for convention purposes).

Scientific Discussions

Many papers dealt with the exact determination of x-ray and ultraviolet radiations, as measured by their physical, chemical and biologic effects. Four clinics, under the leadership of Dr. E. A. Pohle, gave practical dosimetry demonstrations.

Jorstad and Ernst reported a continuation of their studies upon the effect of different dietary factors upon the undesirable reactions associated with large doses of x-rays. They find that, in experimental animals, by the feeding of ample fat-soluble vitamins and vitamin B, the unfavored effects could be largely eliminated. In this same field Smith has recently demonstrated that, in clinical practice, the administration of vitamin D **(Viosterol)** alone serves admirably to check or prevent "radiation sickness." The beneficial results seem to be obtained through the regulation of the calcium and phosphorus metabolism.

Still another group of papers dealt with the relation between the production of arthritis and the existence of intestinal stasis, as demonstrated by roentgenography. Jenkins, for instance, referred to the colon as a "master focus" in the production of disease.

Stein and Arens ably presented a continuation of their gynecologic studies, in which they combine pneumoperitoneum and the injection of radiopaque oils for the diagnosis of female sterility.

In the field of radiotheray, the outstanding development seems to have been the demonstration that malignant diseases, particularly of the glandular type, are best treated by the use of *small doses* of both x-rays and radium, over an extended period, as advocated by Regaud.

Contrast Media

Cholecystography, by the oral method, has amply demonstrated its simplicity and accuracy. Administration of the dye in capsules has been largely supplanted by the use of the commercially available, single-dose preparations. These are of three types: (1) Mechanical mixtures of sodium tetraiodophenolphthalein and organic acids which, upon addition of water, yield tetraiodophenolphthalein acid, in the form of a white precipitate (Shadocol, Keraphen, etc.); (2) Tetradol, a partially-neutralized solution of the dye which, before administration, is poured into grape juice; and (3) Cholecystocol, which is a creamy emulsion of colloidal tetraiodophenolphthalein. In

the last-named, complete neutralization has been carried out and precipitation prevented by the use of a protective colloid. In the hands of several observers, it has proven palatable, efficient and certain.

Distinct improvements seem to have been made in still another class of radiopaque media, the halogenated oils. Several years ago, Putman showed that, for certain purposes at least, **brominized oils** could advantageously replace their iodized analogs, such as Lipiodol. More recently, Crandall and Walsh have demonstrated that iodized oils, when in contact with delicate tissues are, contrary to the general belief, distinctly irritant.

One commercial exhibit featured two brominized oils of identical radiopacity but of widely varying viscosity. One, closely allied to the old iodized oils in its physical properties, is designed for bronchial visualization, while the second is almost as free-flowing as water. This greatly facilitates introduction into a sinus or fistula, and aids in the study of the rate of drainage. Furthermore, this oil, because of its low viscosity, has successfully replaced sodium iodide solutions in **pyelography,** where its lack of irritation and high radiopacity would seem to make it of particular value.

Reference should be made to the recent volume, "Gall-Bladder Disease," by D. S. Beilin, of Chicago. This appears to be an excellent manual for those interested in the application of cholecystography.

EQUIPMENT

In the field of roentgenologic equipment, particular emphasis is now placed upon safety. This is achieved, either through the use of self-rectifying tubes mounted in the shielded transformer unit, or through the use of insulating oil filters. Motor-driven tables and equipment now reduce physical efforts to a minimum. The "Metalix" tube, described in detail at the 1928 meeting in Chicago, does not seem to be generally available in this country.

The Cleveland disaster has served to emphasize the necessity for greater care in the handling and storage of films. One exhibit, in particular, featured a convenient sectional system which could apparently be expanded at will to meet future needs. Another showed an elaborate shadowbox, which could be wheeled about in the office or the operating room as conditions required. It was even equipped with a rheostat for varying the intensity of the light source. Mention must here be made of the unique and very successful large shadowboxes devised for the scientific exhibit of the meeting.

On the whole, Radiology is making definite and satisfactory progress, along with the other scientific adjuncts of Medicine.

THE RELIGION OF SCIENCE

Scientific medicine is the application of knowledge of all kinds—that is, of science—to the physical, the mental, and the moral benefit of mankind. Science unapplied, or applied only to the gratification of personal vanity or personal taste, is cold and soulless; use it for man's best interests and it becomes elevated to the dignity of a religion.

This application of knowledge to man's highest interests on earth is the religion of science—an eminently practical religion, showing itself by its works; a religion which, humble though it be, and fully conscious of its imperfections, still struggles with its best efforts to do good; a religion which asserts its fallibility, and by that very assertion holds out an assuring promise of continued improvement; a religion which, ex necessitate rei, can have no set creed; for, modified by the ever increasing fund of abstract knowledge, its intellectual formulae must change accordingly, while its benevolent work goes on, forever improving with the accumulating knowledge of the ages.—SAMUEL LOGAN, M.D., 1885 (A.M.A. Bulletin, *June*, 1929.)

THE SEMINAR

CONDUCTED BY

MAX THOREK, M.D. (*Surgery*)

GEORGE B. LAKE, M.D. (*Medicine*)

[NOTE: Our readers are cordially invited to submit fully worked up problems to the *Seminar* and to take part in the discussion of any or all problems submitted.

Discussion should reach this office *not later* than the 1st of the month following the appearance of the problem.

Address all communications intended for this department to *The Seminar*, care CLINICAL MEDICINE AND SURGERY, North Chicago, Ill.]

PROBLEM NO. 10 (*Medical*), 1929

Presented by Dr. C. F. Barber, Felicity, O.

(See CLIN. MED. & SURG., Nov., 1929, p. 825)

Recapitulation: A man, 55 years old, has had pain in the upper left abdomen for two years, growing worse. Now boring in character and penetrating to the upper left lumbar region. He had recently lost over 40 pounds in weight.

The physical and laboratory examination was practically negative, except for a shifting tender spot in the upper left abdomen, a vague and uncertain mass in the same locality and an appearance, on the roentgenogram, suggesting spondylitis of the 2d and 3d lumbar vertebrae.

A short time later his pain became so severe that it was scarcely controlled by morphine, and a mass, which varied in size and showed expansile pulsation, appeared below the left costal margin and grew larger up to the time of the patient's death.

Requirement: Diagnosis and suggested treatment.

DISCUSSION BY DR. GEORGE A. BENDLAGE, LONG BEACH, CALIF.

In Dr. Barber's case, the *differential diagnosis* would be as follows:

1.—Disease of vertebrae: Spinal caries, cancer, hydatid cyst.

2.—Obstruction of the thoracic duct, with backward tension in the receptaculum chylae.

3.—Cancer at the head of the pancreas.

4.—Pancreatic cyst.

5.—Disease of the spleen.

6.—Abscess of liver (*Entamaeba histolytica*).

7.—Tabes.

8.—Aneurism of the splenic artery.

9.—Hydatid disease of the kidney.

10.—Hypernephroma.

11.—Aneurism of the abdominal aorta.

Diagnosis: Perhaps any of the eleven captioned conditions, especially pancreatic cyst and vertebral disease, may fit into the picture presented by Dr. Barber. But, to me, the spondylitis or erosion of the vertebrae, constant boring pain, and expansile, pulsating tumor, which gradually increased in size, plus other symptoms given, makes me most suspicious that this was an *aneurism* of the abdominal aorta. It is well to remember that the x-rays rarely show this type of aneurism: However, they do show the erosion produced by the pressure of the aneurism.

Treatment:

1.—If, after careful study of the case, we decide that it is an aneurism, it is a medical case.

2. —If an aneurism of the aorta can be eliminated, and the diagnosis is still vague and uncertain, I believe that an exploratory laparotomy is justified.

DISCUSSION BY DR. L. REZNIKOFF, SOMERSET, PA.

The *diagnosis* in Dr. Barber's case seems to be, clearly, an *aneurism* of the abdominal aorta. The "shooting" character of the pain suggests gastric crises and points to syphilis as the cause, in spite of the negative Wassermann reaction, for one negative test does not rule out this disease, by any means.

The appearance resembling spondylitis, on the x-ray plate, was probably an erosion of the lumbar vertebrae, opposite which the aneurism was located. Such lesions are not uncommon in these cases, and sometimes are the direct cause of death.

The loss of weight might suggest carcinoma, but the tumor was not constant; the x-ray study of the gastrointestinal tract was negative; and the expansile pulsation practically rules out cancer.

Treatment should consist of: (1) Absolute rest in bed for two or more months; (2) the administration of potassium iodide, in large doses; (3) a non-stimulating, dry diet; (4) further measures, as determined by the symptoms.

DISCUSSION BY DR. O. M. MOORE, YORK, NEBR.

The history of this case, together with the negative results of the physical examination, points to a diagnosis of *aortic aneurism*, below the celiac axis.

The safest treatment would be: Rest, a properly regulated diet and cautioning the patient as to the danger of exercise.

SOLUTION BY DR. BARBER

At autopsy there was found a *sacculated aneurism of the abdominal aorta*, surrounded by and adherent to a carcinomatous growth which involved the wall of, and which apparently had its origin from, the first portion of the jejunum. The aneurism had ruptured into the small bowel, and consequently the stomach and upper portion of the small intestine were filled with blood. No metastases were found. There was slight erosion of the 2nd and 3rd lumbar vertebrae.

CLOSING DISCUSSION BY DR. GEO. B. LAKE, CHICAGO

The diagnosis of aneurism was rather clear, in this case, and was made by all of the discussants, so that it need not be dwelt upon. Dr. Bendlage summed up the differential diagnosis very well and Dr. Reznikoff's discussion was penetrating, as will be seen by comparing it with the autopsy findings. His only error was in being too ready to rule out carcinoma (which he suspected, on the findings), because the aneurism was more evident. We must remember that a man rarely dies of one disease alone, and not confine ourselves to a single diagnosis. If we would think more often of possible coexisting abnormalities, our treatment would sometimes be more intelligent.

The presence of the carcinoma, with the aneurism, rendered any treatment unavailing, at the time the patient was seen by Dr. Barber. But it may not be amiss to say a few words about the management of aneurism of the aorta, not complicated by malignant disease.

Aneurism is almost (if not quite) always syphilitic in origin—in spite of the single negative Wassermann test—and the primary treatment is that of the underlying syphilis. Here the *iodides* are of special value; and such drugs as Calcidin, Soluble Iodine, Peptoiodine and Siomine are frequently better borne than is potassium or sodium iodide. The doses should be rather large and continued for a long time.

Rest in bed is essential—it should have been *absolute*, for a time at least, in such a case as this.

The diet should be light, with *restricted fluids*. Elimination, by all routes, should be maintained. Repeated *blood-letting* (50 cc. daily, for several days) reduces tension and favors coagulation.

If the aneurism is accessible, one might be justified in trying the injection treatment recommended by Dr. R. Kelson Ford (see *C. M. and S.*, Dec., 1929, p. 927), as Osler once remarked that he never saw a case of aortic aneurism cured by medical treatment.

PROBLEM NO. 1 (*Medical*), 1930
Submitted by Dr. J. Paul Jones, Camden, Ala.

The patient is a white man, 30 years old, married about a year, a retail merchant.

Family History: The father has had an operation for cholecystitis and is not in good health; the mother has had gastric ulcer; one brother is healthy; his wife has had one miscarriage at three months, but now seems to be well; otherwise negative.

Personal History: He has never had any

(Continued on page 66)

THE CLINIC

PROCTOLOGY

Malignant Disease of the Rectum

(Indications and Limitations of Surgery)

By CHARLES J. DRUECK, M.D., *Chicago*

TEXTBOOK management of malignant disease of the rectum is well defined, but very few of these patients are seen in the early stages of the disease and we must accept conditions as we find them. The symptoms are not classical, and yet the cardinal manifestations, in the suspicious stages, are always there.

The first patient I will present is Mr. T. L. D. He is 54 years old, a native of the West Indies, and has steadily been growing constipated for about a year, during which time he has suffered with digestive upsets and much flatus (gassy stools). These frequent attacks of constipation were, however, promptly relieved by the use of cathartics.

For the past several months he has been passing considerable mucus and diarrheal stools, tinged with bright red blood, and recently, liquid movements were the only evacuations he could have. He has had much constant bearing down in the rectum. Sometimes this tenesmus is uncontrolable and he has noticed that his stools, when formed, are of very narrow caliber. Since the pain in the rectum has become annoying he has not been able to urinate freely without having rectal suppositories. He has lost some weight during this illness.

Rectal Examination.—The anus is filled with mucus and feces and the sphincters seem incontinent. In the rectal ampulla (2 inches above the sphincter) is a hard mass, about 2 inches in diameter, which is apparently attached to the anterior wall of the rectum. The surface of this mass is very nodular. It is possible, with two fingers in the rectum, to place one finger on each side of the pedicle of the mass. Digital examination is not painful, nor is palpation or moving of the mass.

The patient feels somewhat easier and the local discomfort is relieved when the tumor is lifted off of the sphincter. There does not seem to be any infiltration of the rectal wall at the base of the tumor. From my examination the tumor appeared pedunculated, but even under anesthesia it was found impossible to deliver the mass through the anus.

By a posterior proctotomy the rectum was opened as high as the tip of the coccyx and the tumor was then delivered with difficulty. It had a well-defined base, about a quarter of an inch in diameter and one-half inch long. The base was excised deeply into the bowel wall. Only a slight hemorrhage resulted and that was easily controlled with a few ligatures. The rectal wall was closed with a No. 1 catgut, the levator ani and sphincters approximated with No. 2 chromic gut and the skin left open. Considerable infection occurred, and therefore the wound closed slowly.

When this tumor was removed it was found well pedunculated, without sloughing. Clinically it appeared to be a benign tumor and the first sections were so reported, but on more thorough examination the pathologist said:

"The microscopic sections show: (1) A fibrous mass with much inflammatory infiltration and at least one abscess; and (2) an adenomatous proliferation, with atypical cells and invasive tendencies. The appearances are suspicious of malignant disase, but a final opinion cannot be rendered, because the structural relations are not clearly understandable from the part submitted for examination. The condition should be treated as adenocarcinoma."

This report embarrassed my early statement to the patient and left me in serious doubt. He has made a very fine recovery, but I have explained to him that the condition must be treated as a potential cancer—watched at least once a month as long as the rectal wound is clean and healed, but, should any recurrence take place, the entire rectum must be excised.

In passing I want to show you another rectal tumor, recently removed, which caused much rectal pain, bleeding, mucus discharge and tenesmus—symptoms similar to those of the preceding case—but on which the pathologist reports: "The microscopic sections present the appearance of a papillary, adenomatous, polypoid growth of the rectum, with chronic inflammatory changes."

The other case that I want you to study with me is that of a man, aged 61, whose complaint when he entered the hospital was abdominal pain and distention, with hiccup for the past 3 days.

About October, 1927, he began to have severe diarrhea, going to stool every half hour, day and night, making it impossible for him to hold any job. Although he consulted several physicians, he did not receive medicine or treatment, but was advised that some time he would require an emergency operation.

Ten days ago the diarrhea seemed to lessen and, for 3 days before admission to hospital, he had no stools; his abdomen distended and he vomited several times. During all this illness he has not lost much weight and his appetite has remained good. There has been urinary hesitancy at times, but no pain on urinating.

His only illnesses, since childhood, have been rheumatism for several weeks, 33 years ago, and operations for left inguinal hernia, 46 years ago, and for right-sided hernia, 15 years ago.

Examination.—A male, acutely ill and apparently suffering a great deal of abdominal pain. There is frequent hiccup and audible peristalsis. There was no emesis during the examination. The abdomen is much distended and tense.

Rectal examination reveals a large prostate and, just above it, a nodular tumor on the anterior wall of the rectum. The tumor fills the whole rectum, the lumen of the bowel being located with difficulty. It is not possible to reach around or above the tumor.

The appearance of the patient — distended, drum-like abdomen, obstipation and hiccup—is typical of intestinal obstruction; and the fact that the condition has continued for 3 days, with but little vomiting or pain, until very recently, points to the lower bowel as the seat of the trouble. Obstruction of the upper intestinal tract is usually associated with sharp pain, much vomiting and rapid dehydration and shock; but, as we pass down the digestive tract, the symptoms come on more slowly until, when we reach the pelvic bowel, there is but little pain and that not well localized; more hiccup and not vomiting; and shock comes on slowly. Therefore we presume this man's obstruction is in his colon.

He obviously has a complete obstruction that demands an immediate venting externally. Local anesthesia has many advantages when our patient is in extremis; but this patient's drum-like abdomen, with much audible peristalsis, assured me that the moment the muscle wall was opened the bowels would be forcibly extruded, and such an exposed loop is very painful to manipulate. Therefore, we evacuated his stomach of about 200 cc. of mucus and, under general anesthesia, the abdomen was opened through a left rectus incision. The intestines immediately crowded out and were restrained with difficulty. As soon as the sigmoid was delivered through the wound it distended enormously and was promptly punctured to relieve the tension and prevent rupture. A catheter was fixed in the bowel with a purse-string suture. Within the next few days the colon emptied itself and the abdominal distention went down, the patient's appetite improving simultaneously.

These patients are poor surgical risks, because they are much debilitated and therefore many complications occur, but we will discuss them at another time.

CLINICAL NOTES AND PRACTICAL SUGGESTIONS

Solvency Records and Physical Records

THE woman who cleans my office informed me that she had bought ten shares of a sound and rather expensive utility stock. This woman has a husband and two children. The husband has been a steady worker, temperate in his habits and not inclined to spend money foolishly. The son is subnormal mentally and a constant source of expense (not medical.) The daughter, like the father and the mother, is intelligent, industrious, and a great credit to her parents.

The father and mother have about completed payments on a modern, two-flat building. They have a very limited education, but are good citizens and a credit to their community. They could well afford, and would be quite ready to do so, if they were aware of its value, to pay $100.00 for a physical examination with all the laboratory adjuncts.

Records of this kind should be made of all people and should be kept on file in their family doctor's office.

Twenty-five years' experience in the practice of medicine has led me to this conclusion: Physicians who never made a complete physical examination and who, because of lack of training, are not able to make an examination whose findings would be worth while, cannot see the value or the necessity of having such records as the above. No argument will convince them. They realize their inability to make an examination of that kind and refuse to be convinced of its necessity.

Men are certainly as important as real estate. Real estate is submitted to a careful examination, and the record of that examination is carefully guarded and preserved. In the course of years many accidents happen to real estate. A record of these accidents, as they occur, is attached to the original. Real estate must be protected by frequently consulting this accumulation of records.

Until physicians take at least half as much interest in the status and histories of their patients as real estate dealers manifest in the lands under their charge, there is little hope that the economic condition of the profession will be materially improved.

EMMET KEATING, M.D.

Chicago, Ill.

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[There is food for thought in Dr. Keating's suggestion. The remark, that the men who are *down* on a thing are the ones who are not *up* on it, applies with force in this case.

Preventive Medicine is the Medicine of the future, and no physician, except, perhaps, those who expect to see the end of their professional usefulness within five or ten years, can afford to overlook this fact. Those who fail to take steps, *promptly*, to qualify themselves to make adequate and informative physical examinations and to *keep complete records of them* will, we believe, soon find themselves in a very annoying or serious economic position.

The medical world is *moving*, and we must move with it or we will find ourselves lying along the back trail among the debris. No modern physician's office is completely furnished without some device for caring for his professional and financial records.—ED.]

Association of Military Surgeons

THE thirty-seventh annual meeting of the Association of Military Surgeons of the United States, at Denver, Colo., from September 26 to 28, was a most interesting affair, with Dr. C. H. Lavinder, of the U. S. Public Health Service, presiding.

The Association was honored this year by a number of representatives of foreign governments, present as their guests. Among these were:

General Polyvios Coryllos, of the Greek Army.

Colonel Kuangfu Chen, of the Chinese Army.

Lt. Colonel Daniel M. Velez, of the Mexican Army.

Lt. Colonel Cesar A. Zevallos, of the Peruvian Army.

Lt. Colonel M. B. H. Ritchie, of the British Royal Army Medical Corps.

Major Giovanni Perilli, of the Italian Army.

While the chief value of these meetings is the stimulation of military feeling and the spirit of comradeship among medical officers of the various branches of the Army, a number of interesting and instructive papers were read at the various sessions.

Brig. General William H. Wilmer, of Baltimore, was elected president of the Association for the ensuing year.

All physicians who hold commissions in the Medical Reserve Corps or the National Guard should make a sincere effort to attend the meetings of this Association whenever it is possible to do so.

JEROME J. WEIL, M.D.,
Capt. M.C., Nat. Guard.

Chicago, Ill.

Ephedrine in Cardiac Dyspnea
(A Personal Experience)

BEING one of the *rarae aves* who often tries a new drug upon himself, I started with ephedrine hydrochloride about one and a half years ago, to relieve the feeling of respiratory oppression which I have had for many years, due to chronic myocarditis and pulmonary emphysema with the usual bronchitis. It is of great help to me. After taking one grain (64 mgm.) about one-half hour before breakfast, I feel greatly relieved and am frequently able to walk from my home to the train, a distance of over a mile, with comparative ease. At first I took ½ gr. (32 mgm.) three times a day, but found that the evening dose excited me too much and kept me awake more than usual, as I am a very poor sleeper. It affected me in a similar way as would coffee, taken toward evening.

I am taking 1 gr. (64 mgm.) of ephedrine every morning, year in and year out, and feel better for it. I did not have to increase the dose. Of course I do not feel perfectly well; I have edema and have been taking digitalis for at least sixteen years, but I am sure that I would not be able to do as much work as I do without the ephedrine. Now and then, when I want to feel relatively well in the evening, I take one-half to one grain, and later use one of the barbituric hypnotics or some similar drug to secure a night's sleep.

Ephedrine has no effect upon my pulse rate, which is very irregular and erratic, ranging between 60 and 100 a minute.

I am not aware of any noticeable increase of urine. The trouble I have, now and then, in micturition is probably due to prostatic troubles.

C. RENZ, M.D.

San Francisco, Calif.

The Dentist and Medical Education

SEVERAL years ago I was undecided as to what profession I would study. Being a graduate in pharmacy, the medical course was offered to me in four years. However, I took the regular course in Dentistry from a Class A university. Now a university, in the same town with that which previously offered me the four year course, tells me that if I wish an M.D. degree, I will have to study for four more years. This seems rather ridiculous.

Years ago I assisted a physician in maternity and fracture cases, giving ether and chloroform anesthesia; I also taught several physicians the incompatabilities, toxic effects and dosages of drugs and did quite a number of hospital blood and urine examinations, in which line of work I can compete with many physicians. I have been quite a student of medical literature and have administered various types of serum from time to time—tetanus, pertussis vaccine, diphtheria toxin-antitoxin, etc. I have diagnosed many cases of illness and referred them to physicians.

Years ago I did a good deal of counter prescribing for various diseases, from gonorrhea to syphilis. I was closely associated with physicians and helped in various office treatments; and now, with all this experience to my credit, a school from the same city tells me it would require four years to complete a medical course.

I have a good knowledge of materia medica (better than that of several physicians whom I know) and can diagnose the commoner maladies as accurately as the average doctor. Why should it take four years for me to complete a medical course??

HENRY LOUIS TILLY, Ph.G., D.D.S.,
New Orleans, La.

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[There are many inconsistencies in the field of medical education and this seems to be one of them. Perhaps it is due to the activities of the dental autonomists, who have been so eager to keep their profession entirely separate from Medicine that they have done an injustice to their confreres who desire to take up the mother profession.

If dental societies all over the country would take this matter up with the Council on Medical Education of the A. M. A., they might be able to obtain some suitable action.—ED.]

Rotating Night Service

PHYSICIANS of the Milwaukee County Medical Society take steps to meet one of the criticisms that have been directed against them—namely, complaints of patients that sometimes they were unable to get a physician at night. The doctors will operate a service bureau which will handle night calls and which will know at all times what physicians are immediately available. For this action the medical society is to be commended.

Such a plan ought to work, not only for the benefit of patients, but of the doctors themselves. There is no reason at all why a physician should have to be on duty twenty-four hours a day. Doctors deserve their period of rest, especially those who have difficult work to do in the morning. They deserve their recreation, the same as other people. But of course, since sickness waits on no man, the job of having available at all times adequate medical aid has to be taken care of. That can be done, through organization, as the doctors have planned. It is another step showing that the practice of medicine is no longer a purely individual thing but is a matter for cooperation.—*Milwaukee Journal*, May 13, 1929.

Congenital Visceral Extrusion

A YEAR or more ago I attended the birth of a child with a very unusual abnormality. There was a defect in the anterior body wall which left the heart and liver entirely exposed, as shown in the accompanying picture.

In spite of this defect, the infant lived for eight hours, with the heart beating outside of the body.

M. E. BOVEE, M.D.,
Port Huron, Mich.

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[Upon receiving this report, we wrote to Dr. Bovee for further information about the family history of this infant—ages of parents; history of malformations; presence of syphilis; etc.—but he had made no such records and the people had moved away.

This illustrates the importance of fully working up any interesting cases that come in one's way. In this manner, many contributions may be made to medical progress.

The extent of the defect, as shown, appears to preclude the possibility of surgical closure, in an attempt to save the life. —ED.]

Aural Diphtheria

IN SPEAKING of diphtheria, we generally associate the disease with the most familiar locality affected by it, and hence we have the terms nasal, pharyngeal or tonsillar, and laryngeal diphtheria. We often forget that there is such a condition as wound diphtheria, and also cutaneous diphtheria.

Recently a man came to the office complaining of a discharge from the right ear. There had been no pain at any time. Examination of the auditory canal showed some serous discharge, and a dirty-white membrane lining the canal, from the meatus to and including the surface of the tympanum.

From the appearance of the membrane and the foul odor of the discharge, a diagnosis of suspected diphtheria was made and a culture was sent to the Health Office. This was reported positive, and he was given 20,000 units of diphtheria antitoxin. At this time the greenish-grey membrane could be seen at the external auditory meatus, completely occluding it. Local treatment was also instituted, and in a couple of days the condition had cleared up.

There were no constitutional symptoms, such as one sees in cases of throat diphtheria, probably because the skin does not absorb the toxin so readily as the mucous membranes do.

It is presumable that infection always takes place through some break in the continuity of the skin, and may occur by contact with an infected individual or through the use of contaminated articles.

R. STEWART MACARTHUR M.D.
Los Angeles, Cal.

[It is well that the possibility of the infection of other areas than the upper respiratory passages, by the Klebs-Löffler bacillus, should be called to mind. Diphtheric infection of wounds was not especially uncommon in the hospitals in this country, during and after the World War.

Whenever any part of the body shows a membrane resembling that of diphtheria, suspicion should be aroused and a microscopic examination made *at once*. If the specific organism is found, treatment with antitoxin should be instituted without delay.—ED.]

Tell Your Patient How He Feels: Don't Ask Him

TO *TELL* your patient how he feels, instead of asking him, is a complete reversal of the general order. Of course, you will work it only when you know the patient is *better*. The same psychology that works in one patient, works in the other. To tell the patient who is improving that he is better is as helpful to that patient as it would be harmful to tell the other class of cases that they are not so well.

In selected cases, therefore, it is to your personal advantage, and much more so as regards the patient, when you tell him that he is improving, rather than having him tell you.

The patient's mentality may cause him to think he is better (as in tuberculosis cases) when he is not. On the other hand, he may think he is worse when his physical condition, as indicated by the results of your examination, distinctly shows that he is better.

To be in this enviable position requires careful and continued studies of all the available tests, signs and symptoms. Your thermometer will show much of real value as the decreasing temperature curve proves a correct diagnosis, proper selection of remedies and the improved reading, which, while not all-inclusive, is a distinct evidence of the general condition.

Consider your diabetic patient. Your proper handling of the case, as to both diet and drugs, plus the patient's cooperation, will show good results in the decreasing percentage of sugar in the urinary tests. The lessened sugar figures support you in your statement to the patient that he is better.

In your cases of high urinary acidity (as shown by the percentage of acid, not the litmus test), your proper drug selection, with suitable hygienic measures, appears in succeeding tests, with a decreasing acid figures, and you *know* the patient is improving. I do not suggest that the hyperacidity is the major condition; but it is the most easily determined index of the symptom complex. The decreasing acid figure means an improvement in the abnormal body chemistry, indicating a return to normal—or, at least, a returning. Most of the "chronics" show this high acidity, suggesting that diagnosis by name is not so important as an appreciation of the several or many pathologic factors present.

To have his doctor state definitely, "You are better today," introduces interest, wonder and appreciation which, of themselves, establish that confidence and optimism so valuable toward a more speedy recovery.

The doctor today must "sell himself," to use a popular expression. Anything you can do or say that will establish confidence in the minds of the patient and his friends will help the sale.

Another example. Take some acute spasmodic conditions—say intestinal colic. You give nitroglycerine, 1/250 grain (0.25 mgm.), by mouth and, in the case of a blonde, with your watch in hand you can promise drug action, as shown by headache and throbbing temporal vessels, in ten seconds; which action lasts another fifteen seconds only.

You can generally predetermine the corresponding drug action with clock-like definiteness as to aconitine, pilocarpine, Neonal and others.

Study your drugs and your patients, so that you can take full advantage of every available asset, determining in advance and *telling* the patient how he is, rather than using the hackneyed, "How are you this morning?" There is value in having the patient say he is better, but *you say it first.*

F. B. KIRBY, M.D.,

Evanston, Ill.

A Tribute to Dr. W. T. Belfield

THE brilliant and sustained services of the late Dr. Belfield were such as to excite the admiration of his fellows from the first. It was his fortune to study, on the continent, the methods of his specialty when they were first given practical value by the newly invented technic of Robt. Koch. He was again fortunate in receiving an early invitation to deliver the then-well-known Cartwright Lectures in New York, on the subject of bacteriology. I think this occurred in 1882.

With much prestige, he then entered upon his urologic career in Chicago, and immediately began his studies on the diseases of the prostate—a subject in which he maintained an active interest to the last.

Especially was one's delight in the work of Dr. Belfield excited by his remarkably condensed, lucid and polished literary style. He wasted no words; he referred to no irrelevant facts; but he gathered all statements that could clarify or broaden his arguments, for Dr. Belfield wrote only when he had important new facts to present or a new outlook from which to view his field.

One admired his temerity in writing one of his most brilliant and farreaching contributions, after he had suffered an almost mortal cerebral hemorrhage.

His Cook County Hospital interns owe him life-long obligation for his generous teaching in his department, especially in the earlier days, when the lore of his field could not easily be reached in America.

WELLER VAN HOOK, M.D.,

Chicago, Ill.

(Continued from p. 59)

serious illness and denies venereal infections and vicious habits. He came to Camden, from Brundige, Ga., a few weeks before being taken ill.

Present Illness: In the latter part of May, 1929, the patient had an attack of fever, with severe general aching over the entire body and extreme prostration. There was no disturbance of the bowels and no acute abdominal pain nor pain in any special set of muscles. The attack subsided in a few days, leaving him very weak, but recurred after about three weeks, when the same course was followed. Several of these attacks have now occurred. In July he began to have pain in the region of the liver, radiating under the right shoulder blade. He has lost a few pounds in weight since the beginning of his illness.

Physical Examination: A careful, general examination, made in the latter part of July, including x-ray studies of the chest, was essentially negative.

Laboratory Studies: *Urine*, shows a few pus cells and occasional granular casts; otherwise negative. *Blood*: Red cells, 4,500,000; leukocytes, 7,000; hemoglobin, 80 per cent; differential (various counts), polymorphonuclears, 53 to 60; lymphocytes, 23 to 32; eosinophiles, 7 to 18. No malarial parasites. *Serologic studies*: Wassermann test, negative; agglutination tests for typhoid, typhus and *B. abortus*, negative, except one *partial* typhoid agglutination. *Stools*: Numerous *Lamblia Intestinalis* were found, July 30.

Requirements: Probable diagnosis and suggested treatment.

THE LEISURE HOUR

A Limit to Altruism

"Gentlemen," said the surgeon as he entered the lobby of the Good Egg Club, "in a room next door lies a man hovering between life and death. One thing will save him. Is there a gentleman here who will volunteer to give me a quart, just one quart, of——"

"That's enough, doc, I'll do it!" cried out an athletic youth.

"But it must be good, you know. It must be pure. I shall have to make a careful examination."

"Sure thing. Step right in here."

They entered an adjoining anteroom and the sturdy man started to remove his coat.

"Here, here—what's the idea?" demanded the doctor.

"Don't you want to examine me?"

"Certainly not. Just let me see the whiskey."

"Whiskey? Well, of all the nerve! Think I'd give up a quart of good whiskey for a guy I never saw in my life? I thought you only wanted blood."—*The Doctor.*

The Psychoanalyst

A psychoanalyst is a kind of spider who spins his pathologic web-complex so widely and so elaborately, only in the hope that somewhere, at all events, the fly must become entangled.—Havelock Ellis.

Mistaken Identity

Two men met in the smoking compartment of a Pullman car and, after a careful scrutiny, one remarked:

"Pardon me, but didn't I meet you in Paris?"

"Hardly," replied the other, "for I have never been there."

"Neither have I," returned the first; "it must have been two other men."

Hospitals are places where people who are run down wind up.—*Judge.*

Out and In

Some fellows stay right in the rut,
While others head the throng.
All men may be born equal, but
They don't stay that way long.
There is many a man, with a gallant air,
Goes galloping into the fray;
But the valuable man is the man who's there
When the smoke has cleared away.
Some "don't get nuthin' out of life."
But, when their whines begin,
We often can remind them that
They "don't put nuthin' in."

—Author Unknown.

An Englishman was watching a tall monument rise out of the Atlantic.

"That," said an American proudly, "is our Statue of Liberty."

"Yes," returned the Briton drily, "we, too, raise statues to our honored dead."

Ancient Pharmaceuticals

"Pa, did Moses have dyspepsia, like you?"

"How do I know? What makes you ask such a question?"

"Why, our Sunday School teacher says the Lord gave Moses two tablets."

Dangerous Beverage

She: "Did you know that the water has rotted away the post in front of our house?"

He: "Mercy goodness, and the teetotalers put that stuff in their stomachs!"—*Buccaneer.*

My Paw

I ricollec' once my Dad
Told me to do somethin', an' I was mad,
An' I allowed I'd show him there was nothin' to it.
So I sez, right out flat:
"I aint a goin' to do it"—
But I was mistaken about that.

—B. H.

Thumbnail Therapeutics

Treatment in Pneumonia

We can do much to improve the general clinical picture of pneumonia and lessen its mortality rate by treatment which is subordinated to the principle of physiologic support. As a result of personal experience extending over a considerable period, I suggest that, among the things which make physiologic support are: Protecting the patient from chilling; giving a special diet (supplying daily 38 Grams of protein, 90 ounces of water and 1200 calories); letting the bowels alone, except when particular indications for moving them appear; using a definite but flexible program of heart stimulation when needed, which employs strophantine as the chief agent; and treating symptoms with caution and conservatism.—DR. E. E. CORNWALL, of Brooklyn, in *M. J. and Record*, June 19, 1929.

Viosterol and Eczema

In 4 cases of eczema in children, 2 of which were very severe, irradiated ergosterol (viosterol) administration caused a very rapid disappearance of the skin affection when other treatments, continued for a long time, had failed. Apparently the resisting power of the organism is enhanced by the vitamin D.—DR. C. JACOBSEN, in *Deut. med. Wchnschr.*, May 3, 1929.

Dietary Control of Dental Caries

Clinical and experimental observations on series of children have shown that dental caries has been arrested in many instances, under divergent conditions of health and environment, by the ingestion of diets high in general mineral and vitamin content. All diets were designed to give adequate protein and calories, but in other respects they varied widely in nature. The arrest usually became apparent after about two months of dietary control.

On the basis of the clinical experimental observations, it is thought that active caries should be viewed as indicative of nutritional deficiencies. These deficiencies may not make themselves obviously apparent in any other way. Yet, when the food intake is made adequate, caries will become arrested, and in other respects there will be evidences of better health.—DRS. J. D. BOYD, C. L. DRAIN and MARTHA V. NELSON, Iowa, City, in *Am. J. Dis. Child.* Oct., 1929.

"Transpulmin" in Tuberculosis

Favorable results in 28 out of 40 patients with pumonary tuberculosis followed the use of "Transpulmin." This is a sterile solution of basic quinine and camphor in ether oils. The types of cases treated were of the productive and cirrhotic variety; acute infections and those of the cavernous type were excluded as unsuitable.—DRS. H. F. NEWTON and K. HEINE, *Am. Rev. Tuberc.*, Nov., 1928.

Avoiding Influenza

To lessen the danger of infection from influenza, when there is an epidemic, keep away from crowds or assemblages of people; filter the air breathed by cotton plugs placed in the nostrils; apply lanolin to the lips and nose and wear spectacles to protect from spray from coughing persons. Disinfection of the nose, throat and mouth is always a wise precaution.—DR. P. SCHMIDT, in *Deut. med. Wchnschr.*, Jan. 25, 1929.

Oxygen Therapy

Cyanosis is the guide to oxygen therapy. In the past, oxygen therapy has fallen into disuse because of poor methods of administration. It can be successfully given in tents that fit over the beds, and also with a nose catheter, if the flow is rapid enough

to provide 2 litres per minute. For this, large tanks, with reducing valves and flow meters, are necessary.

In pneumonia, little can be accomplished to overcome cyanosis with oxygen, when this condition is due mainly to circulatory failure, which can be determined by the quality of the pulse, the blood-pressure, and by coldness of the extremities. Oxygen therapy can not overcome cyanosis in lobar pneumonia, when consolidation is too great, and is most successful when cyanosis is caused, altogether or in part, by moisture in the air passages or alveoli. There is no contraindication to oxygen therapy, and oxygen inhalations, up to 60 percent, are safe under all circumstances.—Dr. M. A. Blankenhorn, Cleveland, Ohio, in *West Virginia M. J.*, Oct., 1929.

Measles Serum

In general, it may be said that, at the present time, convalescent measles serum is a valuable agent for protecting young and susceptible children against a malady which, without the serum, may cause harmful and sometimes fatal results.—B. White, Ph.D., Boston, in *Ann. Intern. Med.*, Oct., 1929.

Liver Extract in Sprue

In 2 cases of verified sprue, treated with liver extract, the responses were similar to those usually obtained in pernicious anemia—rise in reticulocytes, increase in blood count and improvement of gastro-intestinal symptoms, with gain in weight and general well-being. These results are additional evidence of a close relationship between sprue and pernicious anemia.—Drs. A. L. Bloomfield and H. S. Wyckoff, San Francisco, in *Am. J. Med. Sc.*, Feb., 1929.

Digitalis Therapy in Pneumonia

Digitalis therapy, to increase the cardiac output in the pneumonic heart, is on a very uncertain basis. It has not been proved that digitalis can do this.

Many believe that there are only two indications for digitalis: Tachycardia due to auricular fibrillation, and decompensation.

Physicians who give digitalis routinely, when not specially indicated, in pneumonia, should realize that they are adding a potential poison to an already intoxicated system.—Dr. Robert C. Treiman, in *J. Missouri State M. A.*

Liver Extract in Scurvy

The active principle in liver substance seems to be closely related to vitamin C.

A number ot test animals were given a diet lacking in vitamin C, and all died of scurvy; others given the same diet, plus liver extract, did not develop the disease.—Drs. Aron, Hirsch-Kauffman and Schädrich, in *Klin. Wchnschr.*

Thoracic Empyema Treated by Injections of Optochin

A case of thoracic empyema following pertussis was treated by thoracentesis and intrapleural injections of ethyl hydrocuprein hydrochloride (10 cc.), and surgery was unnecessary. Recovery, except for bilateral otitis media, was uneventful. Recent examination shows that the lungs are clear clinically and that the child's general condition has improved rapidly. Three 10 cc. injections were given, after aspiration of pus, on 3 successive days.—Dr. S. Rosa Frank, Philadelphia, in *M. J. & Record*, Feb. 6, 1929.

Warts

Massive doses of roentgen rays or radium, with close screening of the surrounding skin, will cure many common warts.—Dr. Howard Fox, in *Am. J. Surg.*, April, 1929.

Pituitary Solution in Constipation

Several cases of chronic constipation were successfully treated with Pituitrin (pituitary solution) after other measures had failed.

A subcutaneous dose of 1 cc. of pituitary solution was followed by an enema, given in the knee-chest position. This treatment was repeated twice a week for three months.—Dr. C. D. Ambrose, in *Penn. M. J.*, March, 1929.

Current Medical Literature

Desiccated Stomach in the Treatment of Anemia

In June, 1929, Castle demonstrated that the stomach of normal persons secreted a substance which could develop a blood-maturing principle from meat. In *J.A.M.A.*, Sept. 7, 1929, further clinical and experimental studies on this subject are reported by Drs. C. C. Sturgis and R. Isaacs, of Ann Arbor, and Dr. E. A. Sharp, of Detroit.

On the basis of a similar embryonic origin it was believed that stomach tissue might contain the same antianemic principle that makes liver substances so effective in pernicious anemia. This assumption has been borne out by the observation that the feeding of desiccated whole hog's stomach produced a complete remission (in 3 patients) in pernicious anemia, which indicated that stomach tissue contains a red blood-cell maturing substance.

It is even suggested, from the experimental investigations, that stomach tissue is more active, per grain, than is liver, as a smaller amount of the former is required to induce a remission in a patient with pernicious anemia.

The question of the origin of the active principle in the desiccated stomach is not determined, but further work along this line is being pursued. Meantime, it is established that whole desiccated hog stomach and hog stomach defatted with petroleum benzin produce a satisfactory hematopoietic remission in pernicious anemia. This fact leads to further speculation as to the etiology of this disease.

Inorganic Elements and Blood Regeneration

In *J.A.M.A.*, Oct. 19, 1929, Drs. V. C. Myers and H. W. Beard, of Cleveland, report that, not being satisfied with the findings of certain investigators, that copper played an unique role in hemoglobin metabolism, they instituted independent investigations, with the view of determining the therapeutic action of various inorganic elements as a supplement to iron in nutritional anemia. The experiments were on rats placed on a nutritional anemia-producing diet.

By their experiments the authors have been able to show that germanium possesses much the same supplementing action to iron as does copper.

Further investigations were then made with arsenic, manganese, nickel and cobalt, the first three of which appear to supplement iron quite as well as copper or germanium.

All the elements reputed to be of therapeutic value in anemia are close to iron and arsenic in the atomic periodic series, except mercury, and at one time mercury was recommended in the treatment of syphilitic anemia.

The present eperiments show that when rats have been rendered anemic by an exclusive milk diet and 0.5 mg. of iron is given daily, traces of manganese, nickel, copper, germanium and arsenic all have a definite supplementing action on hemoglobin regeneration.

Simple Diagnostic Blood Tests

A simple but valuable differential diagnostic hematologic procedure, which will furnish fairly reliable information, is described by Dr. A. Weiss, of New York City, in *J. Lab. and Clin. Med.*, July, 1929.

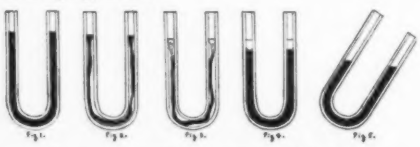


Fig. 1.—Normal, five minutes after filling.
Fig. 2.—Normal retraction, three-fourths to one hour after.
Fig. 3.—Retraction in case of severe anemia or infection.
Fig. 4.—No retraction, one to twenty-four hours after filling, as in essential purpura.
Fig. 5.—No coagulation five to thirty minutes after filling. Hemophilia.

A piece of capillary tubing about 3 or 4 inches long is bent into a U under a gas flame. The finger-tip or ear is pricked deep enough to give a rapid flow of blood sufficient to fill the tube, which is held horizontally, one of the arms touching the blood drop. The tube is gradually changed to the vertical position until about three-fourths full. No air bubbles are permitted to enter.

Normal blood will clot in about 3 to 5 minutes. In from ½ to 1½ hours, the margins of the clot will retract, showing a clear, transparent and colorless serum (Fig. 2).

In severe infections, the clot-retraction time will be decreased and there will be a sedimentation of erythrocytes, depending upon the severity of the infection (Fig. 3).

In hemophilia (see Fig. 5), the time of clotting will be considerably increased (from ten to sixty minutes).

In suspicious secondary anemias, there will be sedimentation and decreased clot-retraction time, if the anemia is post-hemorrhagic; the serum will be clear and colorless and probably perceptibly increased, as compared with the blood clot. In primary, pernicious anemias and hemolytic icterus, there will be sedimentation of the blood cells and a definitely yellow serum.

In purpura hemorrhagica, at the end of 24

hours, there would be absolutely no retraction of the clot (Fig. 4).

The accompanying illustration shows some of the findings as explained. Useful facts concerning blood cell morphology can be obtained rapidly in this way.

Oxygen Therapy in Pneumonia

Dr. A. L. Barach, of New York City, in *New York State J. Med.*, Aug. 15, 1929, reports upon a series of 100 patients with pneumonia, treated in an oxygen tent or oxygen chamber.

The oxygen tent consists of a square hood placed over the head and chest of the patient, with a closed system of ventilation in which the air is cooled and dried by direct passage over ice. The oxygen chamber consists of a large room which is ventilated by convection currents set up by a system of brine pipes on one side of the room and a steam radiator on the other side.

The group of cases treated was characterized by the uniform presence of cyanosis, a generally critical condition of the patient and the application of treatment late in the disease. Comparison of the mortality in this series with that of a group of untreated cyanotic pneumonia patients and a group of partly treated cyanotic patients shows a decided decrease in the oxygen-treated series (48 percent compared with 56 percent). In the case of one patient who lived in an oxygen tent for two months, the oxygen appeared to prolong life until the patient finally developed an immunologic resistance to the disease. The average stay in the tent or chamber in the recovered cases was about 6 days.

Control of Scarlet Fever

In *Am. J. Dis. Child.*, Nov., 1929, Drs. G. F. and Gladys H. Dick, of Chicago, review the results of their methods of testing for, immunization against and treatment of scarlet fever. These methods include a skin test for determining susceptibility to scarlet fever, a method of active immunization of susceptible persons and an antitoxin, specific in the treatment of scarlet fever.

Regarding the reliability of the skin test with sterile toxin, 20,856 persons, with spontaneous negative reactions, passed through one or more epidemics of scarlet fever without contracting the disease.

Among 11,584 susceptible persons, immunized in institutions where scarlet fever was epidemic, no case of scarlet fever occurred. The incidence of scarlet fever under similar circumstances, where no immunization is practiced, may be from 10 to 50 percent of those exposed.

The doses of sterile toxin for active immunization should be graduated, beginning with 500 skin-test doses, in the first injection, and increasing to 80,000 or 100,000 skin-test doses in the last. The injections are made subcutaneously, at intervals of one week, and about five doses are given. If the full amount is given in each dose, the five doses may be counted on to immunize completely 95 percent of susceptible persons and to modify considerably the susceptibility of the rest. More than 90 percent of those immunized to the point of an entirely negative skin reaction retain their immunity for at least 3 years.

Reports as to the therapeutic effects of scarlet fever antitoxin are conflicting, due to delay in administering the serum, in some cases, or to the use of poor preparations of antitoxin. Most scarlet fever antitoxins of European manufacture are considerably weaker than the best American serum. The European serums contain from a trace to 5,000 neutralizing units per cc.; while the best supplied in America contains 30,000 units.

Amytal Anesthesia in Obstetrics

Dr. D. L. Drabkin and associates, of the University of Pennsylvania, write in *Am. J. M. Sc.*, Sept., 1929, on the effect of Amytal anesthesia upon the uterus and its use in obstetrics.

Amytal (iso-amyl-ethyl-barbituric acid) was used for anesthesia in 33 obstetric patients in the hospital of the school of medicine, University of Pennsylvania. The dose was 25 mg. per kilo of weight, in 30 cases, and 30 mg. in 3 cases, given by the rectum.

In 13 cases the result was excellent. The patients were quiet, apparently in deep sleep; but uterine contractions continued. Amytal does not interfere with the oxytocic action of pituitary extract.

In 10 cases the results were classified as good. The patients moaned or moved somewhat during uterine contractions, but were quiet and relaxed between pains. In 7, the results were fair. In 2 patients the results were poor.

In all cases, administration of the drug resulted in a condition of amnesia—the patient had no recollection of the period of labor.

Little, if any, effect was noted on the maternal pulse, temperature or respiration. In 5 cases the blood pressure dropped more than 10 mm. of mercury. There was little, if any, effect on the child.

Ephedrine an Antidote for Sodium-Amytal

In *Phys. Therap.*, Sept., 1929, Dr. E. N. Kime, of Indianapolis, states that when sodium-amytal is used as an intravenous anesthetic agent, an antidote consisting of caffeine-sodium benzoate, 15 grains (0.97 Gm.) and ephedrine 25 minims (1.54 cc.) should be given. hypodermically, before the patient leaves the operating room. This prevents sodium-amytal shock.

Metaphen in Larva Migrans

In the *Jour. S. Carol. Med. Assn.*, Nov., 1929, Dr. F. K. Rhodes, of Florence, S. C., states that he has seen 6 cases there of the creeping skin eruption—larva migrans. This disease is said to be common in Russia, Arabia and elsewhere; comparatively few cases have been reported from North America, though from

Dr. Rhodes' experience it would seem to be more common here than is believed.

The disease spreads by burrowing of the larval parasite beneath the skin.

Dr. Rhodes states that, by injecting Metaphen into and around the advancing edge of the eruption, he succeeded in obtaining perfect cure.

New Method of Suturing Wounds

Dr. C. E. Rees, of San Diego, in *J.A.M.A.*, Aug. 17, 1929, describes a new method of suturing wounds.

A hypodermic needle, long enough to extend through the two margins of the wound at the same time and having a long bevel, is loaded with either horsehair or silkworm gut and inserted through the margins of the wound in the position in which the suture is to be placed. After the needle has been inserted through both margins, the suture material is pushed out through the beveled point of the needle and held, either by forceps or by fingers, while the needle is withdrawn. The suture is then in the same position in which it would be had it been placed in the usual manner and is tied carefully so as to avoid pain. A 19 or 20 gage needle is used for gut and a 23 or 24 gage needle for horsehair.

This method obviates most of the pain formerly associated with the closure of accidental wounds too small to warrant the use of a general anesthetic or the injection of procaine.

[NOTE: The topical use (not injection) of the mild local anesthetics, Butesin or Anesthesin (benzocaine), will increase the popularity of any physician who does minor surgery.—ED.]

Amidopyrine in the Treatment of Measles

In *Illinois M. J.*, Oct., 1929, Dr. A. Hoyne, of Chicago, declares that Tunnicliff's antimeasles diplococcus goat serum is of definite value in checking epidemics of measles in hospitals or similar institutions if administered within 3 days of exposure.

Dr. Hoyne pays a high tribute to the value of amidopyrine in measles. He states that he regards it as the most remarkable remedy in the treatment of this disease. In an outbreak of measles in the Children's Memorial Hospital, it was determined to try amidopyrine. The results were astonishing. Frequently within an hour after the first dose the temperature would fall from two to three degrees. Cough was allayed and complications rare if this drug was given as early as the first day of the rash.

The following dose was arbitrarily adopted: One grain per year of age up to five years; five grains the maximum dose regardless of age and, in each instance, administered either every four hours or else four times daily, depending upon the severity of the case; the medication to be continued for about three days or until the temperature remained below 100°F.

On numerous occasions during the past few years, Dr. Hoyne has expressed the opinion that amidopyrine was like a specific in the treatment of measles. This is in accordance with the view expressed by a British physician, Loewenthal, in 1924.

If a diagnosis of measles is made on the observation of Koplik spots, before the appearance of the rash, and amidopryine is prescribed, the results are even more striking.

At the Children's Memorial Hospital, the Cook County Contagious Disease Hospital and the Municipal Contagious Disease Hospital, in Chicago, the administration of amidopyrine is a part of the routine treatment for all cases of measles.

In a statistical table which accompanies his article, Dr. Hoyne shows the very excellent results obtained in the institutions named, following the treatment of measles with amidopyrine.

The Therapeutics of Barbituric Acid Derivatives

In *Am. J. M. Sc.*, Sept., 1929, Dr. S. Weiss, of Boston, writes upon the pharmacology and therapeutics of the barbituric acid derivatives, based on personal observations of patients, as well as upon an analysis of the records of 135 patients admitted to the Boston City Hospital between 1910 and 1928, with acute poisoning due to such agents.

The conclusions arrived at from this study are as follows:

1.—The evidence presented suggests that man is more susceptible to the barbituric acid derivatives than are animals, and that, in man, a relatively smaller percentage of the fatal dose produces analgesia and narcosis.

2.—Marked individual variations exist in the response of patients to identical doses. The state of the central nervous system is one of the important factors which determine the variations in the intensity of effect and in the persistence of action. Sensory and motor excitement act antagonistically, while depression acts synergistically with the barbituric acid derivatives.

3.—Sodium-luminal (phenobarbital), injected intravenously in doses of from 0.4 to 1.2 Gm., at a rate of 50 mg. per minute, in a 10-percent solution, stops convulsions, produces muscular relaxation, and induces sleep with considerable regularity. The narcosis, even after such large doses, may be superficial and the analgesic effect may be only partial. The effect of a single dose may last as long as tweve hours.

4.—In certain patients with severe status epilepticus, eclampsia, grave toxic reactions from local anesthetics, convulsions due to cerebral hemorrhage or with tetanus, the intravenous administration of sodium-luminal and other barbituric acid derivatives is of distinct therapeutic value.

5.—The routine use of the intravenous hypnotic dose of the barbituric acid derivatives for surgical anesthesia, or for the inducement of sleep of days' duration, in certain psychoses, is dangerous.

6.—The mechanism of the action of the barbituric acid derivatives is different from that of ether, chloroform and nitrous oxide. These anesthetics usually cannot be replaced by the barbituric acid derivatives. The hypnotics of the barbituric acid series have marked inhibi-

tory influence on certain medullary and midbrain centers.

7.—The dose administered to a patient should be determined by the individual behavior of the subject during the slow intravenous administration of the hypnotic. In the pathologic conditions discussed, the intravenous administration of large sedative or hypnotic doses should be used only if the condition of the patient is critical, and when other measures, which are just as efficient and more safe, are not available. It should be remembered that a hypnotic dose of any barbituric acid derivative entails potential danger for the patient.

Nasal Spray Administration of Hormones

In *Endocrinology*, July-August, 1929, Drs. J. P. Pratt and M. Smeltzer, of Detroit, point out that hormones may be satisfactorily introduced into the blood stream through the mucous membranes, especially the nasal mucosa. This method has been found most satisfactory in giving ovarian extract in cases of disturbed menstrual functioning.

This method of medication may be employed by the patient at home. An ordinary nebulizer or atomizer is used. In the case of ovarian extract, a concentration of ten rat units per cc. is employed, and this quantity is used as a nasal spray each day during the last two weeks of the intermenstruum.

When pituitary extract is indicated, it can be self-administered also by nasal spray. The absorption is slower and the effect more durable than when administered by injection.

Contraception and Maternal Health

While there is vast progress in cutting down the general death rate, the maternal death rate has remained practically unchanged. The chief and predominant cause for this is the unfitness of the mother to bear a child. The physical unfitness is often the cause of unwillingness of the mother to continue the pregnancy, with the result that all sorts of the most crude methods are used to bring on a miscarriage. Puerperal sepsis, with frequent fatal complications, is the direct result.

These women should never have become pregnant and should have been instructed in contraceptive methods, as sanctioned by ethical medical practitioners.—Dr. Helen Miller, in *Birth Control Review*, Oct., 1929.

Zinc Ionization of Chronic Ulcers

In *Arch. Phys. Therap., X-Ray, Radium*, Aug., 1929, Dr. L. Gries, of Chicago, reports his results with zinc ionization treatment of chronic ulcers.

This treatment is based upon the conviction that drugs can be made to penetrate to an appreciable depth of tissue by the passage of an electric current; that drugs applied in such a manner are less irritant than when applied in solution; that ionized zinc enters into combination with the protoplasmic constituents of bacteria; that leukocytes carry a negative charge and are, therefore, attracted to the anode; and that the passage of the galvanic current has a stimulative action *per se*.

The chronic ulcers treated, although differing in etiology, were alike in that they were chronic, non-luetic and were rebellious to continued ordinary treatment.

In regard to technic, a pad of cellucotton, immersed in 2-percent zinc sulphate solution, was cut to the size and pattern of the ulcer area; a piece of Crooke's metal, smaller in size than the cellucotton, was applied to it and to this the positive electrode of the galvanic current was attached. The negative pole was attached to a pad about three times the size of that under the positive pole and applied on the same side at a distance of 18 inches from the lesion. The current was gradually turned on to the toleration point, the treatments being for 30-minute periods, at 7-day intervals.

The appearance of the surface of the ulcer gradually changed, owing to combinations of the zinc with the tissue proteins. Finally, epithelialization and complete healing took place. A number of lupoid, indolent and varicose ulcers have been treated with success by this ionization method.

Parathormone in "Radium Poisoning"

Three cases of radium poisoning are reported by Drs. F. B. Flinn and S. M. Seidlin, of New York, in *Bull. Johns Hopkins Hosp.*, Nov., 1929. These were cases of intoxication, not due to exposure to gamma rays, but occurring in painters of luminous dials, from the habit of pointing, in the mouth, the paint brush containing a radium salt, with a certain amount of ingestion and absorption.

The main manifestations in these cases are characteristic. The x-ray pictures show sharply-circumscribed, round areas of rarefaction in the skull, resembling those frequently seen in cases of myeloma or metastatic tumors. All three of the authors' patients showed such lesions, and also showed radio-activity of the tissues. These cases were treated by injections of Collip's parathyroid extract (parathormone). All exhibited a marked decrease in radio-activity in 7 weeks; radio-active material is eliminated in the stools.

The Practice of Sociologic Medicine

Dr. A. B. Jackson, in *M. J. and Record*, Aug. 21, 1929, asserts that although, in the past, there has been a decided talk of cooperation between public health bodies and the private physician, a more cordial cooperation is now being effected, which enlarges the opportunities of both. This is instanced in both Washington, D. C., and in New York City.

Dr. Jackson warns that, if the profession does not adopt a prophylactic attitude (as well as a curative) toward disease, the demand for such will come from the public. There is no reason why anyone,with the mental equipment of the average physician, should not study to prepare himself to advise his patients regarding hygiene, sanitation, diet, and to develop a knowledge of the other required processes for immunization, instrumentation, tests and findings necessary in

order to make adequate physical examinations. It is not necessary that a physician be a trained psychiatrist in order to observe certain mental abnormalities among his patients and advise as to their treatment.

Whatever progress national health makes in the future depends upon the attitude the practitioner takes toward sociologic medicine.

There are, in sociologic medicine, untold opportunities for a larger human service, a more dignified practice of medicine, a more satisfactory practice and more adequate financial returns.

Neutral Acriflavine in Gonorrhea in the Male

In *Ohio St. M. J.*, July, 1929, Dr. L. J. Roth, of Columbus, points out that in very recently acquired gonorrhea, in which the gonococci have not penetrated far into the mucosa, it is logical to use a bactericide that has penetrative power but does not injure the urethra. The drug which he has found to meet this requirement best is neutral acriflavine. The urethra is irrigated with one pint of a 1:4000 acriflavine solution, heated to 110°F.

The closest approach to maximal therapeutic effect that the author has found in the treatment of anterior urethritis, where the disease was not aborted the first day, has been to irrigate the urethra with one quart of a 1:6000, hot potassium permanganate solution (110°F), and then to inject 5 percent silver nucleinate, to be retained for 5 minutes. The patient is then given 1:10,000 acriflavine for home use, before retiring, holding the injection in for 7 minutes. He is irrigated every day for 2 weeks, and then every other day for 2 weeks. By this time his discharge is almost nil and is gonococcus-free.

Electrocardiograms in Acute Infections

In *J.A.M.A.*, Oct. 12, 1929, Drs. C. T. Burnett and G. F. Pittz, of Denver, report that they examined with the electrocardiograph a series of 100 patients who, following some acute infection, were especially investigated with reference to some possible heart injury. None of these had shown any signs or symptoms of heart disease prior to the recent infection.

No cases of scarlet fever, diphtheria or frank rheumatism were included and none of these patients gave a history of rheumatic fever.

Twenty-eight (28) of the patients furnished significant changes in the electrocardiogram. In 20 of these, symptoms and other signs of heart disease were lacking or confusing, and in only 3 of the 28 were either heart signs or symptoms sufficient to indicate heart injury.

Pathologic and clinical evidence supports the view that, in the course of many types of acute infections, the heart tissues are involved. Clinical evidences of such injury is often difficult or impossible to obtain. The electrocardiogram offers a means of diagnosis in a sufficently large proportion of these cases to render its more general employment worth while.

Common Colds

Dr. Wm. Wolf, of New York, in *M. J. and Record*, Sept. 18, 1929, from a consideration of the factors involved in common colds, finds that the usually accepted theory of their causation is that blood is withdrawn from a mucous membrane, thus producing a *locus minoris resistentiae* which allows bacteria to propagate and become virulent.

It is, therefore, the first and most essential rule to prevent any chilling of the affected mucous membrane, as well as of any other part of the body, while any symptoms of the cold persist.

The best therapy consists in applying as much heat as possible to the diseased part particularly, and the body generally, by means of hot drinks, hot inhalations, hot sprays, hot applications or diathermy.

Drugs play a minor role in the treatment of colds and should be avoided as much as possible.

In a series of 550 cases of simple colds thus treated, there were only 2 percent of the patients whose acute symptoms lasted more than three days.

Serum Therapy

In a general review of the present aspects of serums and vaccines in the prevention and treatment of disease, B. White, Ph.D., of Boston, in *Ann Intern. Med.*, Oct., 1929, expresses the opinion that fresh and potent serums, and only those of proven value, given early in the disease and by the most favorable route, continue to be the physician's greatest and sometimes sole aid in curing some of the more malignant infectious diseases. But the clinician should neither expect nor demand that immune serums do more in controlling the disease than the immunologist may honestly predict for them.

Bearing in mind that serums represent proteins foreign to the human body, the prudent physician will determine the allergic condition of his patient before such treatment and be ready with epinephrin to combat any untoward reaction following serum injections. A physician may spare his patients the possibility of future serum sickness by not giving serums needlessly.

NEW BOOKS

Burr: Weir Mitchell

WEIR MITCHELL, HIS LIFE AND LETTERS. *By Anna Robeson Burr. New York City: Duffield and Company.* 1929. *Price* $6.00.

Through this fascinating volume strides the man who was, perhaps, the most picturesque, as well as being, in some respects, the most renowned, figure in American Medicine—the neurologist, researcher, Army surgeon, toxicologist, poet, novelist, politician, helpful friend and all-around human being, Dr. Silas Weir Mitchell. Osler, who comes into the picture, is left out of this reckoning, for he was really only loaned to us, for a time, by Great Britain.

Those who look upon heredity as the chief factor in greatness will find consolation in these pages, for the picture here drawn of Weir's remarkable father, Dr. John Kearsley Mitchell, is full of power and compelling versatility, while that of the son, named for his illustrious grandfather, is very appealing.

But the advocate of environment as a molding force will also find arguments in favor of his ideas, for Dr. Weir *lived with* his father and mother and the other seven members of the vivacious and unusual family, as well as with many of the striking personalities of the nineteenth century, including among his close friends the human and magnetic Bishop Phillips Brooks, the inimitable Oliver Wendel Holmes, The Wisters, Lowell, Furness, the Shakesperian scholar, and a number of others. These must have had much effect in shaping the texture of his life.

Here is portrayed a man of tremendous ambitions and self-confidence, pursuing his way, with indomitable will, over heartbreaking obstacles to a far-seen goal of fame and fortune, by means of an almost unbelievable energy and enthusiasm, which remained with him until the last, so that, at the age of nearly eighty-five years, *he died young.*

Here we see his egoism, vanity and love of adulation, overshadowed by his immense tenderness toward the members of his family, loyalty to and enjoyment of his friends, and a complete lack of that jealousy which is often associated with a self-centered nature, so that he was constantly helping and encouraging younger men who showed promise, notable among whom was Hideyo Noguchi.

Without seeing the mass of letters from which selection has been made, it is impossible to say how wise the choice has been, but it is difficult to imagine how, within the limits of a book like this, those included could have been more fit to illustrate the great breadth and variety of the man's interest and contacts and the fundamental beauty of his relations with the people who mattered in his life.

A number of full page illustrations, showing

The Holl Portrait of Dr. S. Weir Mitchell.

the three portraits of him which were painted by well known artists (one of which is here reproduced), as well as those of his mother and father, wife and children, and a number of intimate pictures of his life, friends and surroundings, embellish a dignified volume in which paper, typography and binding leave nothing to be desired.

As a portrayal of the intellectual and social life of Philadelphia, during the last seven decades of the nineteenth and the first of the twentieth century, this book will interest all students of American life and customs.

As a vital exposition of the career of one of the most interesting men who ever adorned the medical profession, in any land or time, no physician can well afford to miss the joy and inspiration which will come from the careful perusal of this splendid biography.

Farr: Local Anesthesia

PRACTICAL LOCAL ANESTHESIA AND ITS SURGICAL TECHNIC. *By Robert Emmett Farr, M.D., F.A.C.S., Minneapolis, Minn. Second Edition, Thoroughly Revised. Illustrated. Philadelphia: Lea & Febiger.* 1929. *Price* $9.00.

A great extension of surgical operations, carried out under local anesthesia, has taken place

since the first edition of this work, in 1923. This extension has not only been numerical, but also in the broadening of the scope of the interventions under this method. The author almost entirely uses infiltration or infiltration-block anesthesia with novocaine (procaine).

The book is divided into three main parts: Part I, consisting of 6 chapters, treats of the fundamental principles of local anesthesia, the anatomy of the sensory nervous system and the general technic. The 6 chapters of Part II are devoted to local anesthesia applied in surgery of all parts of the body except the abdomen. Part III is entirely devoted to abdominal operations.

The detailed special technics for operations in the different regions are thoroughly described in the text and the anatomic points of injection are shown in suitable illustrations.

While leaving no doubt in regard to his enthusiasm for this method of inducing anesthesia, Dr. Farr, as a surgeon, does not hesitate to point out its limitations Thus, in the radical excision of the breast for carcinoma, he feels that its relative safety makes its use, for the present at least, desirable only in the hands of surgeons familiar with the use of local anesthesia; however, poor surgical risks should be operated upon under this method.

The author dwells particularly on the necessity of surgical technic adapting itself to the exigencies of local anesthesia, on the importance of what he calls surgical strategy and on the value of giving special attention to the patient's psyche. In his clinic, a special psychic attendant looks after the patient during the whole operation.

Dr. Farr's work can be warmly recommended to operating surgeons, whether they themselves induce the anesthesia or leave it to assistants. The technical details will also be greatly appreciated by all surgical anesthetists. A notable feature of the book is the number of case reports illustrating the points which the author stresses.

Bucky: Grenz Ray Therapy

GRENZ RAY THERAPY. *By Gustav Bucky, M. D., New York. With Contributions by Dr Otto Glasser, Cleveland, and Dr. Olga Becker-Manheimer, Hamburg. With Forty Illustrations in the Text. Translated by Walter James Highman, M.D., New York. New York: The Macmillan Company.* 1929. *Price* $3.50.

This translation gives English readers an opportunity of studying Bucky's theories and therapeutic applications of the socalled Grenz rays, which are claimed to be preferable to the Roentgen rays, especially in dermatologic work.

The Grenz rays are intermediate between Roentgen rays and ultraviolet rays. The shortest wave lengths of ultraviolet radiation which are available for practical purposes are in the neighborhood of 1,300 Angström units. The longest waves of Roentgen rays used practically in biologic and clinical work are about 1 Angström unit. The Grenz rays emanate from that part of the spectrum lying between about 1 and 3 Angströms units.

The greater part of the book is highly technical and will be of most interest to radiologists. Many matters are still in the stage of discussion.

The general practitioner will be more interested in the claim that the Grenz rays, which may be considered as super-soft Roentgen rays, are particularly applicable to skin diseases, including superficial malignant conditions in which only a slight penetrating effect is requisite. Bucky, however, claims an effect also on deep seated lesions, especially by leukocytary stimulation.

Williams: The Doctor in Court

THE DOCTOR IN COURT. *By Edward Huntington Williams, M. D., Baltimore: The Williams & Wilkins Company.* 1929. *Price* $3.00.

Any physician may at any time be compelled to appear as a medical witness in court. The average physician has no experience and but little knowledge of the methods of procedure and what he may expect.

Dr. Williams' discussion is intended to throw light upon this subject. The information is conveyed in a narrative, semi-anecdotal form which makes the reading pleasant and, at the same time, easily comprehensible.

The book is agreeable to read and is one from which the medical witness will learn of a number of pitfalls into which he may unwittingly be led; for very often the way of the law is, not to lead to truth and justice, but rather to see how far these can be excluded from temples dedicated to them.

Gallichan: Youthful Old Age

YOUTHFUL OLD AGE; How to Keep Young. *By Walter M. Gallichan. With an introduction by Thurman B. Rice, A.M., M.D., Associate Professor of Bacteriology and Public Health, Indiana University School of Medicine, etc. New York: The Macmillan Company.* 1929. *Price* $2.50.

The developments of medical science promise increased human longevity and, as time advances and civilization increases, it is fair to assume that, other things being equal, the span of human existence will materially increase. Although, at the present moment, the man or woman of fifty has fewer years to look forward to than such a man would have had a century ago, yet it would seem that such an anomalous condition should quickly mend. It is, therefore, important that we should learn how to prolong physiologic senescence, and especially how to enjoy it.

Mr. Gallichan's book is one that should be greatly appreciated by and interestingly instructive to every middle-aged person. It gives a rosy hue to the declining period of life and shows how this may be at least as cheerful and enjoyable as any other period of the life cycle. In fact, in old age there are compensations and pleasures that can not be experienced in any other period.

Most of the dread of approaching old age is, in reality, a bogey, and a true appreciation of the facts will scare it away. The old can, to a large extent, if only they will, keep young psychically and somatically, and this without adopting any rigid or unpleasing modes of

living. Mr. Gallichan tells us how. He stresses the value of the happiness of living and shows that a certain amount of self-indulgence in the aged is not reprehensible, but even commendable.

The joy of life, even for the aged, is the main motive throughout Mr. Gallichan's pages, which are written in a pleasantly colloquial and engaging style. It is not so much the living to a very old age that should be the ideal, but rather the living of many happy years. "It is not the length of a piece of cloth that is admired, but the bright colors, the beautiful design and the rich, soft texture."

This is a book that may be recommended to all. Its perusal will make life look brighter, pleasanter and more hopeful for anyone who desires it to be so.

Diamond: Dental Anatomy

DENTAL ANATOMY. *A Graphic Presentation of Tooth Forms with an Original Technique for Their Reproduction. By M. Diamond, D.D.S., Associate Professor of Dentistry and Head of the Department of Dental Anatomy, Columbia University Dental School. New York: The Macmillan Company.* 1929. *Price* $5.00.

The author's conception of dental morphology is based on the premise that the dental apparatus has a single active function—mastication. All restorative manipulations must keep this vital fact in view and follow the designs of nature toward that end. The anatomic structure and relations of each integral part of the apparatus to other approximate parts must be clearly understood.

From the study of large numbers of each of the adult 32 human teeth, which usually show numerous variations, the author has evolved a basic—or as he calls it a symmetrical—form for each tooth. Such a standard forms a basis on which the dental practitioner can work in restoring function.

The book is a decided addition to scientific dental literature. There are 23 chapters in which the anatomy and especially the morphology of the various dental and peridental structures are described and illustrated in detail.

The work bears the hallmark of the sincere and painstaking scientific investigator in his chosen field and is one which the dental teacher and student, the dental pathologist and dental prosthetist will find of constant value in their work.

Rowntree, Brown and Roth: Blood and Plasma

THE VOLUME OF THE BLOOD AND PLASMA IN HEALTH AND DISEASE. *By Leonard G. Rowntree, M.D., and George E. Brown, M.D., Division of Medicine, The Mayo Clinic and The Mayo Foundation, Rochester, Minn. With the Technical Assistance of Grace M. Roth. Illustrated. Philadelphia and London: W. B. Saunders Company.* 1929. *Price* $3.00.

This little monograph deals with the clinical determination of blood volume and plasma volume, these being problems strictly within the field of actual practice. The ordinary, routine erythrocyte count and hemoglobin estimation give but narrow information as to the real blood picture, but the volume and concentration of the blood play a most important part in pathologic physiology.

The senior author was one of the pioneers in the dye method of determining blood volume and plasma volume. The results of over 1,000 such determinations by this method, in various pathologic conditions, are now available and are discussed in this book.

Besides the actual determinations and their clinical value, the technic is described and criticisms of the dye method and suggestions are discussed. The clinical value of the determinations, in regard to the diagnosis, prognosis, and treatment of disease, is still, to a great extent, a matter for discussion, although the authors claim that, in certain pathologic conditions, much valuable information may be obtained. However, as W. J. Mayo observes in an introductory note, this is a step in scientific progress, and the pure science of today is the applied science of tomorrow.

Elwyn: Edema

EDEMA AND ITS TREATMENT. *By Herman Elwyn, M.D., Assistant Visiting Physician, Gouverneur Hospital, New York. New York: The Macmillan Company.* 1929. *Price* $2.50.

The greater part of this monograph is of much more interest to the physiologist and biologic chemist than to the practitioner.

The author's investigations lead him to these general principles of treatment: (1) To diminish the intake of water below that of the output, no matter how small, as long as there is no anuria; (2) total or almost total elimination of sodium chloride from the food; (3) to stimulate the rate of oxidative processes in the cells whenever it is found to be diminished. The chapter on treatment gives a number of methods by which these principles may be carried out.

The author also considers that one or two days' starvation gives good results.

The newer diuretics (Novasurol—merbaphen—Salyrgan, etc.) are adequately discussed.

Chemical Dictionary

A CHEMICAL DICTIONARY. Based on Recent Chemical Literature. *By Ingo W. D. Hackh, Professor of Chemistry, College of Physicians and Surgeons of San Francisco, Calif. Illustrated. Philadelphia: P. Blakiston's Son & Co., Inc.* 1929. *Price* $10.00.

It has been the aim of the author to include in his work, not only the words generally used in chemistry, but also many of the terms employed in the related sciences of physics, astrophysics, mineralogy, pharmacy and biology. This has resulted in a volume of 790 pages, large octavo.

Although this book is essentially a dictionary, with most of the words defined in a brief, concise manner, some of the terms are described at such length and so clarified by the use of tables

diagrams and illustrations, that it becomes, at times, almost encyclopedic.

Another feature that tends to make the volume more than a dictionary is the presence of brief biographic sketches and portraits of many prominent chemists.

The inclusion of a key to pronunciation is an unusual feature, seldom seen in scientific dictionaries.

In spite of occasional minor errors, such as are bound to creep into so comprehensive a work, this dictionary is, undoubtedly, the most complete and helpful publication of its sort that has yet appeared.

—E. B. V.

General Medicine

THE PRACTICAL MEDICINE SERIES. *Comprising Eight Volumes on the Year's Progress in Medicine and Surgery.* General Medicine. *Edited by George H. Weaver, M.D., Lawrason Brown, M.D., George R. Minot, M.D., William B. Castle, M.D., William D. Stroud, M.D., and Ralph C. Brown, M.D. Series* 1929. *Chicago: The Year Book Publishers.* 1929. *Price* $3.00.

This yearly series of handbooks summarizes the medical literature of value issued during the year, with comments by competent editors on the subjects treated.

The present volume on General Medicine is divided into several departments: "Infectious Diseases" is covered by Drs. G. H. Weaver and T. T. Crooks, of Chicago. "Diseases of the Chest (Excepting the Heart)" is edited by Dr. Lawrason Brown, of the Trudeau Sanatorium, Saranac Lake, N. Y. Drs. G. R. Minot and W. B. Castle, of Boston, deal with "Diseases of the Blood and Blood-making Organs; Diseases of the Kidney." Dr. Wm. D. Stroud, of the University of Pennsylvania School of Medicine, comments on the literature of "Diseases of the Heart and Blood Vessels," and Dr. R. C. Brown, of Chicago, covers the literature respecting "Diseases of the Digestive System and Metabolism."

The general or other practitioner, who has no access to a large medical library, will find these yearly surveys of the literature an excellent method of ascertaining what progress is taking place.

Epidemic Encephalitis

EPIDEMIC ENCEPHALITIS; Etiology, Epidemiology, Treatment. *Report of a Survey by the Matheson Commission, William Darrach, Chairman; Josephine B. Neal, Director of Survey; Helen Harrington, Epidemiologist. New York: Columbia University Press.* 1929. *Price* $3.00.

Epidemic encephalitis has become a matter of some world-wide interest and it has seemed desirable to collect statistical information concerning it. This has been made possible by the generosity of Dr. Wm. J. Matheson, of New York, who appointed a commission to make the necessary investigation.

The present volume is the first fruit of this commission. About half the book is occupied by a complete bibliography of the subject and, in the other half, this literature is digested, tabulating the diverse views on etiology and giving a summary of the various treatments applied, with their results.

The work may, therefore, be regarded as an abstract of the world's literature on epidemic encephalitis. The abstracting has been very carefully done and its quintessence so charted and tabulated that the interested investigator sees at a glance the conditions in any country and from any aspect.

Physically, the volume is a beautiful piece of bookwork, printed in clear type, with wide margins, on thin but opaque paper and bound in flexible, black fabricoid, closely resembling leather.

Crook: Orthopedic Surgery

AIDS TO ORTHOPAEDIC SURGERY. *By Eric A. Crook, M.Ch. (Oxon.), F.R.C.S. (Eng.), Assistant Surgeon, Charing Cross Hospital; Surgeon, Queen's Hospital for Children, London. New York: William Wood and Company.* 1929. *Price* $1.50.

A handy little book—one of the *Students Aids* series—giving the elements of recognition and practical treatment in orthopedic surgical conditions. It is suitable for students and may easily be carried in the pocket.

Hyslop: Mental Handicaps in Golf

MENTAL HANDICAPS IN GOLF. *By Theo. B. Hyslop, M.D., F.R.S.E., Member of the Medical Golfing Society, Late Senior Physician to Bethlem Royal Hospital. With forewords by Rolf Creasy, M.R.C.S., L.R.C.P., Hon. Sec. Medical Golfing Society, and John Henry Taylor, Five Times Open Champion. London: Bailliere, Tindall & Cox. Baltimore, U. S. A.: The Williams & Wilkins Co.* 1927. *Price* $1.50.

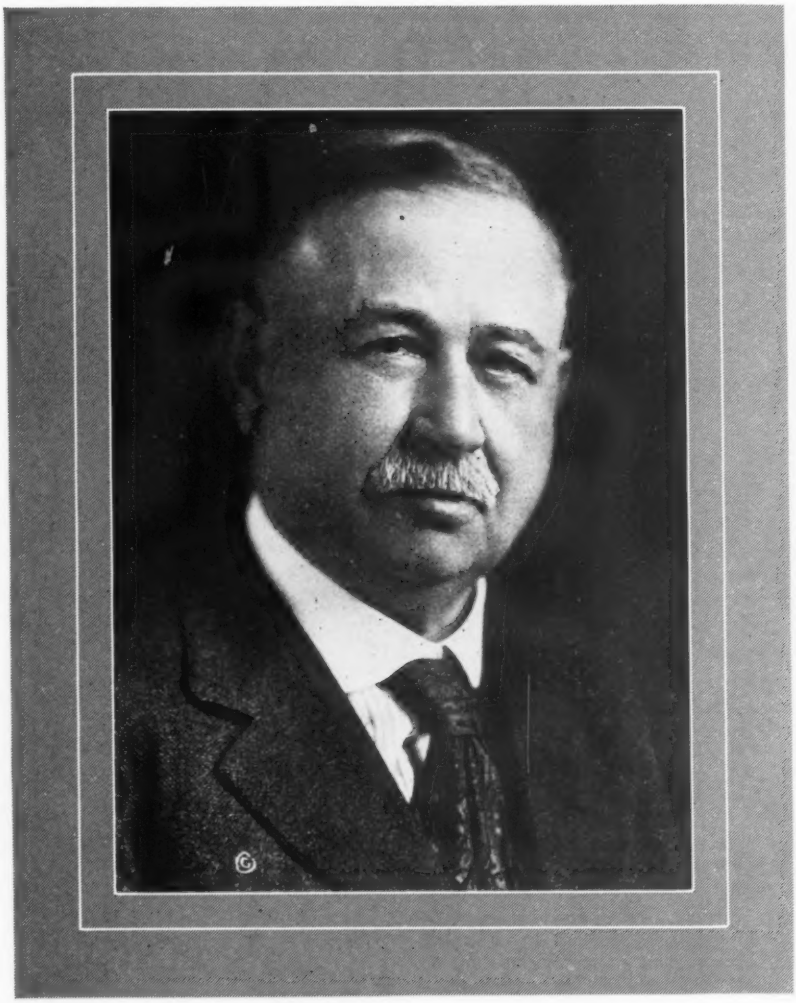
Every golfer is interested in handicaps; and the fact that there are mental, as well as physical, hazards in the game is now widely recognized.

In this little manual, a British psychiatrist of note has devoted a hundred pages or so to discussing the mental attitudes which add to or diminish one's success in the ancient and honorable game. He says that the game of golf is over 90 percent mental.

The formula for par golf, says Dr. Hyslop, contains three main ingredients: *Practice, Automatism* and *Reason;* and, further, that the correct mental stance for all medical golfers (others, too, no doubt) should be one of philosophic detachment from professional and other exigencies. "Why worry" should be the mental mascot.

This small volume is entertainingly written and contains a wealth of suggesions of real use to golfers. It would go very nicely on the waiting-room table, after the doctor has read it, or would make a pleasing gift for a golfing friend.

MEDICAL NEWS



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Victor C. Vaughan, M.S., Ph.D., M.D., Sc.D.

Dr. Victor C. Vaughan Passes

Medical science and the world at large sustained a serious loss with the passing of Dr. Victor C. Vaughan, eminent scientist and educator, who died at his home in Richmond, Va., of a heart attack, November 21, 1929, at the age of 78 years.

Dr. Vaughan was one of the country's foremost toxicologists and bacteriologists, as well as a recognized authority on hygiene and sanitation. He was a pioneer, in America, of the era of bacteriology.

For thirty years (1891 to 1921) he was dean of the School of Medicine and Surgery, of the University of Michigan, and a teacher in that institution. He will be remembered, by those who had the joy and privilege to sit under his instruction, for the immensity of his knowledge, his ready speech, his keen enthusiasm and for his wide sympathy and helpfulness, which made his students love, as well as admire him.

During the Spanish-American War, Dr. Vaughan was a major and surgeon of the 33rd Michigan volunteer infantry; and, after the war, a member of the commission which investigated and reported upon the deplorable sanitary conditions in our camps. In the World War he was a colonel, in charge of communicable diseases, for which service he was awarded the Distinguished Service Medal.

After leaving the University of Michigan, Dr. Vaughan was made Chairman of the National Research Council, in Washington, D. C., where the breadth of his knowledge and experience was of inestimable value.

He has left to us a rich legacy in his published books and in the scores of contributions to the periodical literature of his profession, which he found time to write in the course of his long and busy life.

Don't overlook the prize offers on page 6 of this issue

Moving Pictures in Forensic Medicine

What is believed to be the first instance where moving pictures have been used to settle a medico-legal question, has recently transpired in Detroit, where a young woman was suing for damages for an alleged disability (a limp), resulting from being hit by a truck. The defense showed to the judge and jury a moving picture of the plaintiff, walking down the street *without a limp*.

Don't overlook the prize offers on page 6 of this issue

Endocrine Survey and Medical Herald

The *Medical Herald and Physiotherapist* and the *Endocrine Survey* have united their forces and the combined publication will, apparently, be known by the name of the former.

Dr. Herman J. Achard will be the editor of the reconstituted journal, and Dr. Chas. Wood Fassett the managing editor. The editorial and business offices will be at Glendale, California.

Don't overlook the prize offers on page 6 of this issue

Death of Professor Tuffier

Professor Theodore Tuffier, of Paris, the well known French surgeon and member of the Academy of Medicine, died October 27, 1929, following a prostatectomy. He was in his 71st year.

Cost of Medical Service

The *American Journal of Public Health* is authority for the statement that one-fortieth of the people of the United States (about 3,000,000) are constantly sick in bed; that about 50 per 1000 (6,000,000) are ill with chronic diseases, such as tuberculosis, cancer, heart disease, hernias, etc.; and that the annual bill for all forms of medical treatment is $2,500,000,000, or about $100 for each family.

They also state that 49.7 percent of patients who go to hospitals pay in full for their care; 19.3 percent pay part; and 31 percent pay nothing. It would be interesting to know if the payment of the bills of private physicians is about on this basis.

New Medical Buildings at University of Virginia

On October 22, 1929, a group of new medical buildings was dedicated at the University of Virginia, Charlottesville. The principal address was given by Dr. Ray Lyman Wilbur, Secretary of the Interior.